NAT'L INST. OF STAND & TECH R.I.C.
A11105 898806

NBS
PUBLICATIONS

NBSIR 81-2254

# Tables of Experimental Rate Constants for Chemical Reactions Occurring in Combustion (1971-1977)

Francis Westley

Chemical Kinetics Division
Center for Chemical Physics
National Measurement Laboratory
U.S. Department of Commerce
National Bureau of Standards
Washington, DC 20234

April 1981

Interim Report

QC
100
.U56
81-2254
1981
c.2

Prepared for
**Department of Energy**
**Washington, DC 20545**

and

**Office of Standard Reference Data**
**National Bureau of Standards**
**Washington, DC 20234**

NATIONAL BUREAU
OF STANDARDS
LIBRARY
JUN 10 1981
not acc.-circ.
QC100
.U56
81-2254
1981
c.2

NBSIR 81-2254

# TABLES OF EXPERIMENTAL RATE CONSTANTS FOR CHEMICAL REACTIONS OCCURRING IN COMBUSTION (1971-1977)

Francis Westley

Chemical Kinetics Division
Center for Chemical Physics
National Measurement Laboratory
U.S. Department of Commerce
National Bureau of Standards
Washington, DC 20234

April 1981

Interim Report

Prepared for
Department of Energy
Washington, DC 20545

and

Office of Standard Reference Data
National Bureau of Standards
Washington, DC 20234

U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

NATIONAL BUREAU
OF STANDARDS
LIBRARY
JUN 0 1981

Table of Contents


Abstract . . . . . 1

Introduction . . . . . 2

Guidelines for the User. . . . . 3

Table of Arrherius parameters for chemical reactions occurring in combustion . . . . . 20

Reactions of: O. . . . . 20

$O_2$ . . . . . 38

$O_3$ . . . . . 47

H. . . . . 52

$H_2$ . . . . . 70

OH . . . . . 73

$HO_2$. . . . . 88

$H_2O$. . . . . 92

$H_2O_2$ . . . . . 93

S. . . . . 94

$S_2$ . . . . . 97

SO . . . . . 97

$SO_2$. . . . . 97

SH . . . . . 100

$H_2S$. . . . . 100

N. . . . . 101

$N_2$ . . . . . 103

NO . . . . . 104

$NO_2$. . . . . 113

$NO_3$. . . . . 121

$N_2O$. . . . . 122

$N_2O_3$ . . . . . 125

$N_2O_4$ . . . . . 125

$N_2O_5$ . . . . . 125

NH . . . . . 126

$NH_2$. . . . . 126

$NH_3$. . . . . 127

NHNH . . . . . 129

$NH_2NH$. . . . . 129

$NH_2NH_2$ . . . . . 129
$HN_3$. . . . . 130
HNO. . . . . 130
$HNO_3$ . . . . . 131
$HNO_4$ . . . . . 132
$C_1$ compounds . . . . . 133
$C_2$ compounds . . . . . 163
$C_3$ compounds . . . . . 184
$C_4$ compounds . . . . . 195
$C_5$ compounds . . . . . 213
$C_6$ compounds . . . . . 222
$C_7$ compounds . . . . . 230
$C_8$ compounds . . . . . 231
$C_9$ compounds . . . . . 233
$C_{10}$ compounds. . . . . 234
List of References . . . . . 235
Appendix: Conversion Tables. . . . . 296

# TABLE OF EXPERIMENTAL RATE CONSTANTS FOR CHEMICAL REACTIONS OCCURRING IN COMBUSTION (1971 - 1977)*

Francis Westley
National Bureau of Standards
Chemical Kinetics Division
Center for Thermodynamics and Molecular Science
Washington, DC 20234

A table of experimental rate constants for gas phase chemical reactions occurring in combustion is presented. Specifically, it gives in tabular form the values of the parameters for the modified Arrhenius equation $k = AT^B \exp(-E/RT)$. The table covers reactions occurring in the combustion, oxidation and decomposition of aliphatic saturated or unsaturated $C_1$ to $C_{10}$ hydrocarbons, alcohols, aldehydes, ketones, thiols, ethers, peroxides, amines, amides and their free radicals, as well as the reactions of O, $O_2$, H, $H_2$, OH, $H_2O$, $H_2O_2$, N, $N_2$, NO, $N_2O$, $NO_2$, $N_2O_4$, $N_2O_5$, S, $S_2$, SH, SO, $SO_2$, SOH, NS, with each other. The table includes 220 monomolecular, 1092 bimolecular, and 108 termolecular reactions totalling 1420 distinct chemical reactions. There are 2608 distinct entries, distributed as follows: 308 for first order reactions, 1984 for second order reactions and 316 for third order reactions. The kinetic data were compiled from 843 experimental papers published between 1971 and 1977.

Key words: Arrhenius parameters, chemical kinetics, combustion, decomposition, free radicals, gas phase, hydrocarbons, hydrogen, nitrogen, oxygen, rate of reaction, sulfur.

---

* This work was supported by the Department of Energy and by the Office of Standard Reference Data of the National Bureau of Standards.

# INTRODUCTION

This publication consists of a table of experimental reaction rate constants for the combustion, oxidation and decomposition reactions of aliphatic saturated and unsaturated hydrocarbons, their oxygenated sulfur and amino derivatives, as well as for the reactions of hydrogen, nitrogen oxygen, sulfur and their inorganic derivatives with each other. The table is a compilation of experimental rate constants given in 843 papers published between 1971 and 1977. Its purpose is to provide the kineticists and kinetic modelers with a comprehensive and easy-to-consult reference book on the kinetic data for combustion and oxidation processes. The table gives 2608 distinct reaction rate constants from these 843 experimental papers. A list of references including the 843 papers, arranged alphabetically by author for each separate year, is appended at the end of the table.

For each of reference the bimolecular and termolecular reactions included in the table are listed separately under each reactant, so that a grouping of the reactions according to the first reactant is obtained. As a result, the total number of tabulated entries is 4425, although the real number of distinct entries if 2608.

The presentation of kinetic data is standardized and simplified as much as possible. Rate constants are expressed in the modified Arrhenius equation $k = AT^{B}\exp(-E/RT)$. In general uncertainties are given only for the rate constant k itself and not for the individual parameters in this equation. Sometimes an uncertainty is given for the value of E/R. This uncertainty is only of secondary importance and has been included in the uncertainty stated for the value of the rate constant. Rate constants are expressed in units of $s^{-1}$, $cm^{3}mol^{-1}s^{-1}$, and $cm^{6}mol^{-2}s^{-1}$ for reactions of first, second and third order respectively.

For the readers who prefer other kinetic units than the standard ones, two conversion tables for equivalent second and - respectively - third order rate constant units are appended at the end of this publication.

The arrangement of the tables is described in detail below, in the "Guidelines for the User".

It is hoped that this table of kinetic data will serve as a handy and easy to use reference book for all the kineticists and kinetic modelers interested in combustion and oxidation processes.

This publication is not the result of the effort of a single person, but of the whole staff of Chemical Kinetics Information Center. My thanks to all of them.

In particular, I wish to thank Dr. David Garvin, Chief of the Chemical Thermodynamics Division, and Dr. Robert F. Hampson, Jr., Director of the Chemical Kinetics Information Center, for their more than helpful suggestions and constant guidance; Dr. Wing Tsang, Chief of the Chemical Kinetics Division, for his encouragement in having this table published; Mr. James G. Koch, Supervisor, for putting the tables into a printable computer form; Mrs. Bettijoyce Molino and Mrs. Carla G. Messina from the Office of Standard Reference Data for applying the OMNIDATA and GPSDIC programs to the present tables; Mrs. Geraldine Zumwalt, Miss Natalie C. Atkins, and Mrs. Janice L. Jones for punching and typing a difficult typescript, full of digits and numbers, with particular care.

## GUIDELINES FOR THE USER

### General

As pointed out above, the presentation of the kinetic data in this publication is an attempt to simplify and standardize them. In that respect, the choice of standard units for rate constants was easy; it was found that the most commonly used units for gas phase rate constants are

the cubic centimeter, the mole and the second. The choice of a standard form for uncertainty limits is somewhat more complicated, but when a series of recommended rate constants is to be presented in a tabular form, the uncertainty limits can not be omitted, for an uncertainty assigned to the recommended value of a rate constant is an estimate by the evaluator of the absolute accuracy of the preferred value. It is to be emphasized that in the present tables the concern is with the overall uncertainty of a reaction rate constant and not with the expression of precision of a set of experimental measurements. Most of the uncertainty limits included in this table are uniform within the respective temperature range indicated. However, for a limited number of reactions, the data warrant or require variable limits. In such cases, a note under the respective data indicates for which interval of the temperature range there is a change in the uncertainty limits.

It is thought that the uncertainty limits expressed in the form of lower and upper k factors - f and F, respectively - are the most suitable for tabulation. Thus, if $k_0$ is the central value of a rate constant the limits of reliability for the rate constant $k_0$ are defined by the relationship:

$$fk_0 < k < Fk_0 \qquad (1)$$

i.e. multiplication of the central value $k_0$ by f and F gives respectively the lower and upper reliability limits of the rate constant. In this standardized formulation of uncertainty limits, the value of f is less than unity and the value of F is greater than unity.

However the k factors are not the only way to express the uncertainty limits of a rate constant and different authors use different forms to indicate the degree of reliability of a recommended rate constant. It follows that certain mathematical relationships are needed to translate

the different forms of uncertainty limits into the standard form used in this table (lower and upper k factors). The transformation formulas are given and discussed below.

In general there are two ways to state uncertainty limits: 1) by factors and 2) by algebraic addends

Uncertainty expressed by factors.

Beside the standard form of uncertainty limits expressed by the lower and upper factors f and F, as defined by the above given relationship (1), there is another form which expresses the uncertainty limits by a unique factor. Thus, if $k_o$ is the central value of a rate constant, the statement that $k_o$ is uncertain to a factor of F means that the uncertainty limits are defined by the relationship:

$$k_o/F < k < k_oF \qquad (2)$$

which shows that division and multiplication of the central value $k_o$ by F gives, respectively, the lower and upper reliability limits of the rate constant. By comparing relationships (1) and (2), it is obvious that in the case of an uncertainty expressed by an unique F the upper factor is equal to the unique factor itself, while the lower factor f is the reciprocal of F:

$$f = 1/F \qquad (3)$$

Uncertainty expressed by algebraic addends.

There are three types of uncertainty limits for rate constants expressed as algebraic addends, which are currently used by kineticists: a). Uncertainty appended to one of the Arrhenius factors (A, B, or E/R); b). Uncertainty appended to $\log_{10}k_o$; and c). Uncertainty expressed as a percentage of $k_o$. With respect to the type a) uncertainties, the B factor

uncertainties have been eliminated as being unimportant, while the uncertainties for the E/R factor may be omitted because they are of secondary importance and are included in the k factors. Therefore, the only uncertainty of type a) considered below is the one appended to the coefficient of the A factor.

a). Uncertainty appended to the coefficient of A factor. In scientific notation, the A factor is of the form:

$$A = a \times 10^n \qquad (4)$$

where a is a numerical coefficient less than 10 and n is the power of 10. If an uncertainty $\pm a'$ is appended to the coefficient a, the A factor takes the form:

$$A = (a \pm a') \times 10^n \qquad (5)$$

If lower and upper factors (f and F) are wanted instead, the A factor takes the form:

$$A = fa \times 10^n \qquad (6)$$

or

$$A = Fa \times 10^n \qquad (7)$$

Comparison of (6) and (7) to (5) leads to the relationships: $fa = a - a'$ and $Fa = a + a'$ from which the following formulas are obtained:

$$f = 1 - a'/a \qquad (8)$$

and

$$F = 1 + a'/a \qquad (9)$$

Formulas (8) and (9) are the relationships needed to transform an uncertainty appended to the coefficient of the A factor into one using k factor. A numerical example follows:

$A = (2.0 \pm 0.5) \times 10^{14}$ therefore: $a = 2.0$ and $a' = 0.5$

$a'/a = 0.5/2.0 = 0.25$ and the k factors are: $f = 1 - 0.25 = 0.75$

and $F = 1 + 0.25 = 1.25$

b). Uncertainty appended to $\log_{10}k_o$. If $k_o$ is the central value of a rate constant, C its logarithm to the base 10 and D the uncertainty expressed as an algebraic addend to C, then the following relationship is true:

$$\log_{10}k = C \pm D \tag{10}$$

where $C = \log_{10}k_o$. If D is put in logarithmic form, say:

$$D = \log_{10}F \tag{11}$$

then relationship (10) becomes:

$$\log_{10}k = \log_{10}k_o \pm \log_{10}F \tag{12}$$

which can take the form:

$$\log_{10}k_o/F < \log_{10}k < \log_{10}Fk_o$$

or

$$k_o/F < k < Fk_o \tag{13}$$

Replacing 1/F by f, relationship (1) is obtained. It is obvious that the k factors f and F are the antilogarithms of -D and D, respectively:

$$f = \text{antilog}\ (-D) = 10^{-D} \tag{14}$$

$$F = \text{antilog}D = 10^{D} \tag{15}$$

Formulas (14) and (15) are the relationships needed to transform the type b uncertainties into reliability limits expressed by k factors. A numerical example follows:

$\log_{10}k = 14.23 \pm 0.3$ therefore: $f = 10^{-0.3} = 0.5$ and $F = 10^{0.3} = 2.0$

c). Uncertainty expressed in percentage of $k_o$. Some kineticists prefer to use percentage for defining the uncertainty limits of a rate constant. Thus, the statement that a rate constant is $\pm$ p% uncertain means that the uncertainty limits of $k_o$ are defined by the relationship:

$$k_o - (p/100)k_o < k < k_o + (p/100)k_o$$

$$\text{or} \quad (1 - p/100)k_o < k < (1 + p/100)k_o \qquad (16)$$

Replacing the percentage by the rate, defined as $r = p/100$, relationship (16) becomes:

$$(1 - r)k_o < k < (1 + r)k_o \qquad (17)$$

Comparison of relationships (17) and (1) leads to the following formulas:

$$f = 1 - r \qquad (18)$$

$$\text{and} \quad F = 1 + r \qquad (19)$$

which are the relationships needed to transform the type c uncertainties into reliability limits expressed by k factors. A numerical example follows:

$k = 3.7 \times 10^{12} \pm 20\%$ therefore $p = 20\%$ and $r = 0.2$

Thus: $f = 1 - 0.2 = 0.8$

and $F = 1 + 0.2 = 1.2$

When a percent error has been stated as > 100%, the F factor is determined first, according to relationship (19) then, instead of relationship (18), one simply sets: $f = 1/F$. E.g.: for a 150% error, $r = 1.5$, $F = 1 + r = 2.5$ and $f = 1/F = 0.4$.

The above given relationships: (3), (8) and (9), (14) and (15), (18) and (19) can be used in reverse by the reader who prefers other types of uncertainty limits than the standard k factors, f and F. However a word of caution is necessary. In contrast with the standard uncertainty limits, other types of uncertainties for rate constants using a unique factor or algebraic addend have a constraint imposed upon them. Thus, the uncertainties expressed by a unique algebraic addend are required to be symmetrical with

respect to the central value to which they are appended, while the uncertainty expressed by a unique factor, F, indicates in fact that the upper factor F and the lower factor f are required to be inverse to each other ($f = 1/F$). No such constraints are imposed on the standard uncertainty limits used here and for that reason this type of uncertainty has been found most suitable for tabulation purposes.

If the transformation of the standard uncertainty limits into uncertainties with constraints is desired, some adjustments may be necessary according to the case. The following examples, for transformation of standard uncertainty into a unique factor uncertainty, are an illustration of the necessary adjustments:

1). Standard factors: $f = 0.5$ and $F = 2.0$ It is obvious that $f = 1/F$ and no adjustment is necessary.

2). Standard factors: $f = 0.8$ and $F = 1.2$ In this case, f and F are not inverse to each other. Indeed $f' = 1/F = 0.83$ while $F' = 1/f = 1.25$.

The two pairs of factors, ($f' = 0.83$; $F = 1.2$ and $f = 0.8$; $F' = 1.25$) are quite close. However, it is safer to choose the pair 0.8 and 1.25, by enlarging slightly the uncertainty range.

3). Standard factors: $f = 0.6$ and $F = 1.4$ In this case, not only are the factors not inverse to each other, but the difference is significant: $f' = 1/F = 0.71$ and $F' = 1/f = 1.67$.

The two pairs of factors, ($f' = 0.71$); $F = 1.4$ and $f = 0.6$; $F' = 1.67$) are significantly different. Again, it is safer to choose the pair 0.6

and 1.67, by enlarging the uncertainty range. And, since the concepts of uncertainty and reliability are opposite to each other, enlargement of the uncertainty range will result in a decrease in reliability.

The same adjustments may be necessary for transformation of k factors uncertainties into another type of uncertainties.

## Arrangement of the table

This publication is in two parts:

Part I. The table, arranged in six columns including the chemical reactions, temperature range, the parameters A, B and E/R for the modified Arrhenius equation $k = AT^{B}\exp(-E/RT)$ and the uncertainty limits expressed as k factors f and F.

Part II. The bibliography of part I, including the full references for the 843 experimental papers from which the present table was compiled. Following the bibliography, two conversion tables for equivalent second and - respectively - third order rate constant units are appended. The contents of part I are described in detail below:

Column 1 includes the chemical reactions indicating both the reactants and the products. In the same column, under each chemical reaction, the names of the reactants are given. The chemical nomenclature adopted is the one used in the Chemical Substance Indexes of Chemical Abstracts. Alternative names are not given. The chemical names of the products are not given. The line with chemical names is indented with respect to the line above it. Under the chemical names, the short reference of reviewer's book or article is given. It includes the last two digits of publication's year, followed by the first three letters of author's name. If two authors are given, a slash separates each author's three letters. Again, the short reference line is indented with respect to the line above it. E.g.:

74 HER/HUI indicates the review of rate constants for the reactions between aliphatic hydrocarbons and atomic oxygen, published by Herron and Huie in 1974.

In the same line with the short reference, but spaced out, the order of reaction is indicated by the words "Reaction order:" followed by one of the digits 1, 2, or 3. As pointed out in the introduction, the order of reaction indicates the units for the rate constants as follows:

1 for first order reactions ..... $s^{-1}$

2 for second order reactions ..... $cm^3 mol^{-1} s^{-1}$

3 for third order reactions ..... $cm^6 mol^{-2} s^{-1}$

Following the reaction order, -on the same line-, the presence of an inert reaction partner ("third body") is indicated by the letter M: followed by its chemical formula. E.g.: M:Ar or M:$CO_2$. No indication is given if M is undefined, or if the reaction does not include M.

For a number of reactions, no Arrhenius parameters are indicated. Instead, for each of these reactions, the ratio of the rate constant with respect to the rate constant of a reference reaction is given. This information follows the reaction order information, on the same line, and is indicated by the symbol $k/k_{ref}$: followed by a number.

E.g.: $k/k_{ref}$: 0.59.

The last line of column 1, placed under the line including the short reference and reaction order information, begins with the heading NOTE: It is given only when necessary and might include information

about the dependence of k factors on temperature range, or the reaction taken as reference when the ratio $k/k_{ref}$ is given in the previous line, or other information pertinent to the reaction indicated above. The rate constant, $k_{ref}$, for the reference reaction indicated in the note (by the same author) can be found in the table in the proper place. For a certain number of reactions the relationship $k_1 = K\ k_{-1}$ included in the note indicates that the respective rate constant was calculated from the equilibrium constant K and the rate constant $k_{-1}$ of the reverse reaction. In such cases, the author usually gives the rate constant of the reverse reaction immediately after the data for the forward reaction. The arrangement of the present table (based on the standard order, as described below in the next section) does not allow the forward rate constant of a reaction to be followed immediately by its reverse reaction data. The reader will have to locate the rate constant of a reverse reaction (by the same author) in its proper place in the table.

Column 2, with the heading T/K, indicates in degrees Kelvin the temperature range of validity of the corresponding rate parameters. For some reactions only one temperature is given, meaning that the reaction was studied only at one temperature. The temperatures are alined with the short reference and the reaction order information.

Column 3, with the heading A, gives the value of A for the equation $k = AT^B\exp(-E/RT)$ in short scientific notation. In other words, it appears as a number less than 10, followed by a parenthesis including an integer preceded by the sign +, or -. The number less than 10 is the coefficient of the A factor, while the integer inside the parenthesis is the exponent of 10. Therefore, e.g., 3.5 (+ 14) should be read as $3.5 \times 10^{+14}$. The coefficient of the A factor has no more than one digit

after the decimal point. The units of the A factor are the same as for the rate constant $k_1$ according to the order of the respective reaction, as shown above. For those cases when the recommended value is only one temperature, the entry under this column is in fact the value of the rate constant k at this temperature. As for the temperatures, the data for the A factor are alined with the short reference and reaction order information. If a dash appears in this column, it means that no A factor value was reported by the evaluator for the corresponding reaction.

Column 4, with the heading B, gives the value of B for the equation $k = AT^B\exp(-E/RT)$. The value of B is usually low and varies from 0 to about 3 or 4. It may be negative, or positive. The negative values of B are preceded by the sign -, while the positive values are without sign. No more than one digit is given after the decimal point. If in this column a dash appears instead of a figure, it means that no B value was reported by the evaluator for the corresponding reaction. As for the temperature and A factor, the data for B are alined with the short reference and reaction order information.

Column 5, with the heading E/R, indicates the values of E/R for the equation $k = AT^B\exp(-E/RT)$. Since E is the activation energy in cal $mol^{-1}$ and R the gas constant with a value of 1.987 cal $mol^{-1}$ $K^{-1}$, it follows that the units of E/R are kelvins. The values given in column 5 for E/R may vary from 0 to over 100000 kelvins. The E/R values may be positive or negative. The negative values are preceded by -, while the positive values are without sign. Some of the E/R values included in the table are followed by an uncertainty with plus or minus sign. As pointed out in the introduction, these uncertainties may be ignored, as being included in the lower and upper k factors indicated in the right

column of the table. If in this column a dash appears instead of a figure, it means that no E/R value was reported by the evaluator. As for the data from the previous columns, the values for the E/R factor are alined with the short reference and reaction order information.

Column 6, with the heading "k factors" and two subheading, "f" and "F", indicates the two uncertainty k factors, the lower factor f in the left subcolumn and the upper factor F in the right subcolumn. To find the uncertainty limits of a reaction, its rate constant is to be multiplied by the two factors, as shown above in relation (1): $fk_0 < k < Fk_0$. The values of both factors are always positive. If no uncertainty limits are indicated by the evaluator, both subcolumns of the column 6 are left blank. As for the data from the previous columns, the k factors are alined with the short reference and reaction order information.

## Ordering of chemical reactions.

The general rule for ordering the chemical equations of the reactions listed in column 1 of the table is the standard order of arrangement as described in NBS Technical Note 270-3 pp. 5, 6, and 22*). This rule is applied to the first reactants of the reactions listed in the table, as well as to the reactants following the first. The first reactant of a reaction takes precedence over the following ones. The compounds listed as reactants may include the atoms O, H, S, N, and C, either each of them separately, or several, in any possible combination. The standard order

---

*). Wagman, D. D., Evans, W. H. Parker, V. B. Halow, I., Bailey, S. M., and Schumm, R. H., "Selected Values of Chemical Thermodynamics Properties," NBS Tech. Note 270-3 pgs. 5, 16, 22 (1968).

of arrangement, when applied to these five atomic species, will result in the sequence O, H, S, N, C, each atom in it taking precedence over the following ones. When applied to the first reactants listed in the table, the standard order of arrangement will result in a sequence of five chemical systems, whose order of precedence is as follows:

1). O system, 2). H-O system, 3). S-O-H system, 4). N-O-H-S system, and 5). C-O-H-S-N system.

In each system, the first atom is underlined to show that the compounds containing this atom only, should be listed first. It is to be noted that the atomic species following the underlined atom are in standard order, while the underlined atom itself should be put at the end if the standard order were to be followed. As it will be shown below, this exception to the standard rule, which is apparent only but not real, is due to the fact that all the compounds containing the atoms of a system with the exception of the underlined atom, are already listed in the previous systems. In each of these five chemical systems, the order of the compounds listed in the table as first reactants is as follows:

1). O system: O, $O_2$, $O_3$.

2). H-O system: H, $H_2$, OH, $HO_2$, $H_2O$, $H_2O_2$.

3). S-O-H system: S, $S_2$, SO, $SO_2$, $SO_3$, SH, $SH_2$, SOH.

4). N-O-H-S system: N, $N_2$, NO, $NO_2$, $NO_3$, $N_2O$, $N_2O_4$, $N_2O_5$, NH, $NH_2$, $NH_3$, $N_2H_4$, $NH_3$, HNO, $HNO_3$, NS.

5). C-O-H-S-N system: $C_1$ compounds: C, CO, $CO_2$, CH, $CH_2$, $CH_3$, $CH_4$, CHO, HCHO, $CH_3O$, $CH_3OH$, $CH_3OOH$, CS, $CS_2$, COS, $CH_3S$, $CH_3SH$, CN, $C(NO_2)_4$, CHN, $CH_3NH_2$, CH=N≡N, $CH_3NHNH_2$, $CH_3NO$, $CH_3NO_2$, $CH_3NO_3$, $CH_3ONH_2$.

<u>$C_2$ compounds</u>: $C_2$, $C_2O$, $CH{\equiv}CH$, $CH_2{=}CH_2$, $CH_3CH_2{\cdot}$, $CH_3CH_3$, $CH_2{=}C{=}O$, etc.

<u>$C_3$ compounds</u>, etc., up to $C_{10}$ compounds follow, being ordered according to the same pattern.

It is clear now that, for instance, the compounds included in the <u>S</u>-O-H system contain at least one sulfur atom, while the compounds containing only H, or O atoms, or both, are already listed in the previous two system (<u>O</u>-system and <u>H</u>-O system). It is to be noted that for the <u>C</u>-O-H-S-N system the standard order is applied in a slightly different way: the compounds are first grouped according to the number of C atoms, then the rule for the standard order of arrangement is applied for each group apart. This is necessary as a result of the very large number of organic compounds.

The standard order is applied in the same way for the second, or third reactants of chemical reactions. Since the reactants of a chemical equation can be switched around, a number of bimolecular and termolecular reactions are inserted in the table in two and three places, respectively. E.g.: Reaction $CH_4 + O \rightarrow CH_3 + OH$, is inserted in the <u>C</u>-O-H-S-N system. This reaction may also be written as $O + CH_4 \rightarrow OH + CH_3$ and, as such, is listed in the <u>O</u> system. The advantage of such a procedure is obvious: referring to the example just given the reader will find the reaction between methane and oxygen listed with $CH_4$ as first reactant if he is interested in the reactions of methane, or listed with O as first reactant, if he is interested in the reactions of oxygen atom. The bimolecular reactions are the largest group of reactions included in the table. There are 1092 reactions listed in the table, having as reactants two distinct chemical compounds. Since each of these reactions is inserted twice,

the number of entries for them will amount to about 2000. Only a small number of termolecular reactions has three distinct reactants. As an example, one of them is $NO + NO_2 + O_2 \rightarrow N_2O_5$. This reaction will also be inserted under the forms: $NO_2 + NO + O_2 \rightarrow N_2O_5$ and $O_2 + NO + NO_2 \rightarrow N_2O_5$. A number of second and third order reactions includes a second and - respectively - third body M. For this group of reactions, <u>M will always be placed after all the other reactants</u>, which means that the second order reactions with M as reactant will be inserted in the table only once, while the third order reactions with M as reactant will be inserted only twice. E.g.: Reaction $O_3 + M \rightarrow O + O_2 + M$ is inserted in the table only once, while reaction $NO + O + M \rightarrow NO_2 + M$ is inserted as such, and also under the form $O + NO + M \rightarrow NO_2 + M$.

Most of the chemical reactions included in the table are balanced. A number of reactions are <u>only apparently unbalanced</u>. For instance, reaction

$$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH_2CH_2\cdot + CH_3CH_2CH(\cdot)CH_3 + H_2 \qquad (20)$$

has a rate constant which is in fact the sum of the rate constants for the two reactions

$$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH_2CH_2\cdot + H_2 \qquad (21)$$

and $$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH(\cdot)CH_3 + H_2 \qquad (22)$$

Since the Arrhenius parameters listed in the table refer to the total rate constant, the reaction is listed in the table under the form (20) rather than in two separate forms. In some instances, a reaction is balanced, but the alkyl radicals formed as products are not specified. E.g.:

$$CH_3 + (CH_3)_2CHCH(CH_3)CH(CH_3)_2 \rightarrow CH_4 + [C_8H_{17}\cdot] \qquad (23)$$

The unspecified octyl radical inserted in square brackets as product in equation (23) represents all primary, secondary and tertiary octyl radicals that could be formed by abstraction of a H atom from the reactant 2,3,4-Trimethyl-pentane. There are a number of reactions with the products totally unspecified. In such a case, the word "products" appears after the arrow:

$$(CH_3)_2C = CHCH_3 + N \rightarrow \text{products} \qquad (24)$$

Display of Chemical Reactions and Formulae.

A chemical reaction equation should show as clearly as possible the formation of products from the reactants. For that reason, the reactions listed in the table are written on the basis of semi-structural formulas.

Straight chain hydrocarbons. All saturated normal hydrocarbons up to, and including n-pentane, are written so as to show separately each methyl and methylene group in the chain: $CH_4$, $CH_3CH_3$, $CH_3CH_2CH_3$, $CH_3CH_2CH_2CH_3$, $CH_3CH_2CH_2CH_2CH_3$.

The higher hydrocarbons, from n-hexane to n-decane, are written in a more condensed form to facilitate the counting of the number of methylene groups in the chain: $CH_3(CH_2)_4CH_3$, $CH_3(CH_2)_5CH_3$, $CH_3(CH_2)_6CH_3$, $CH_3(CH_2)_7CH_3$, $CH_3(CH_2)_8CH_3$.

The unsaturated hydrocarbons are written so as to show the position of each double or triple bond in the molecule. E.g.:

| | |
|---|---|
| Ethyne (Acetylene) | $CH{\equiv}CH$ |
| 1,2-Propadiene (Allene) | $CH_2{=}C{=}CH_2$ |
| 1,3-Butadiyne | $CH{\equiv}CC{\equiv}CH$ |
| cis-2-Pentene | cis-$CH_3CH_2CH{=}CHCH_3$ |
| 1-Heptene | $CH_3(CH_2)_4CH{=}CH_2$ |

Alkyl radicals. The unpaired electron of each alkyl radical is always indicated, with the exception of Methyl free radical. E.g.:

| | |
|---|---|
| Methyl free radical | $CH_3$ (no dot) |
| Ethyl, 1-methyl-, free radical (Isopropyl) | $(CH_3)_2CH\cdot$ |
| Methyl, hydroxy-, free radical | $\cdot CH_2OH$ |

If the unpaired electron of an alkyl radical belongs to a carbon in the middle of the chain, it is indicated inside a parenthesis following the carbon atom. E.g.:

| | |
|---|---|
| Propyl, 1-methyl-, free radical (sec-Butyl) | $CH_3CH_2CH(\cdot)CH_3$ |
| Butyl, 1,1-dimethyl-, free radical (2-Methyl-2-pentyl) | $CH_3CH_2CH_2C(\cdot)(CH_3)_2$ |
| Methyl, oxo-, free radical (Formyl) (is written) | $\cdot CHO$ |

Oxy free radicals. If the oxygen atom of an oxy radical is attached to the terminal carbon atom, the radical is written in the usual manner: $CH_3O$. If the oxygen atom of the oxy radical is attached to a C atom in the middle of the chain, then the oxygen atom, together with the unpaired electron, are inside a parenthesis following the C atom: $(CH_3)_2C(O\cdot)CH_2CH_3$.

Peroxo, and other free radicals. The rules for writing peroxo, and other free radicals are the same as for the oxy free radicals: $CH_3O_2\cdot$, $CH_3S\cdot$.

Atoms, like O, H, S, N, and simple radicals like OH, $HO_2$, SH, NH, CH, $CH_2$, $CH_3$, CN are written without dot.

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O + O + M \rightarrow O_2 + M$ | | | | | | |
| OXYGEN ATOM | | | | | | |
| 72 TCH REACTION ORDER: 3 | 298 | 3.6(+15) | - | - | | |
| NOTE: ROOM TEMPERATURE, ASSUMED TO BE 298K | | | | | | |
| $O + O + M \rightarrow O_2 + M$ | | | | | | |
| OXYGEN ATOM | | | | | | |
| 73 CAM/GRA REACTION ORDER: 3 | 196-298 | 3.4(+14) | 0 | -484 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES $k(196)=(4.05\pm0.17)\times10^{9}$ AND $k(298)=(1.74\pm0.13)\times10^{9}\,dm^{6}mol^{-2}s^{-1}$ | | | | | | |
| $O + O + M \rightarrow O_2 + M^*$ | | | | | | |
| OXYGEN ATOM | | | | | | |
| 76 SIA/BIAI REACTION ORDER: 3 | 200-300 | 5.1(+17) | 0 | 655±300 | 0.4 | 2.1 |
| NOTE: $M=O^*(^1S)$ | | | | | | |
| $O^*(^1D) + O_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 73 HEI/HUSI REACTION ORDER: 2 | 300 | 4.2(+13) | - | - | 0.9 | 1.1 |
| $O + O_2 + M \rightarrow O_3 + M$ | | | | | | |
| OXYGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 71 ELI/CAS REACTION ORDER: 3 $k/k_{ref}$: 0.006 | 298 | - | - | - | | |
| NOTE: $O + O_3 \rightarrow O_2 + O_2$: M = He, Ar, Xe, $N_2$ (AT 2537 Å) | | | | | | |
| 71 HIP/TRO REACTION ORDER: 2 | 298 | 1.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 71 HIP/TRO REACTION ORDER: 3 | 298 | 2.9(+14) | - | - | 0.8 | 1.2 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| 71 STU/NIKI REACTION ORDER: 3 | 300 | 2.3(+14) | - | - | 0.7 | 1.3 |
| 71 STU/NIKI REACTION ORDER: 3 | 300 | 2.0(+14) | - | - | 0.7 | 1.3 |
| 71 STU/NIKI REACTION ORDER: 3 | 300 | 2.4(+14) | - | - | 0.7 | 1.3 |
| 72 TCH REACTION ORDER: 3 | 298 | 4.4(+14) | - | - | | |
| NOTE: ROOM TEMPERATURE, ASSUMED TO BE 298K | | | | | | |
| 72 CAS/SCH REACTION ORDER: 3 $k/k_{ref}$: 0.027 | 261 | - | - | - | | |
| 72 CAS/SCH $k/k_{ref}$: 0.006 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O + O_3 \rightarrow O_2 + O_2$; $M=O_2, O_3, N_2$ (AT 3340Å) | | | | | | |
| 72 HUI/HER1 M: Ar | 200-346 | 2.4(+13) | 0 | -510±23 | 0.9 | 1.1 |
| | 218 | 2.5(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Ar(1.0) M: $N_2$ | 218 | 4.0(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $N_2$(1.6) M: He | 298 | 1.2(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: He(0.92) M: Ar | 298 | 1.3(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Ar(1.0) M: $N_2$ | 298 | 2.1(+14) | | | | |
| NOTE: M eff: $N_2$(1.6) | | | | | | |
| 73 BAI/JAR M: $O_2$ | 295 | 2.2(+14) | - | - | 0.8 | 1.2 |
| M: Ar | 295 | 1.5(+14) | - | - | 0.6 | 1.4 |
| M: $N_2$ | 295 | 2.0(+14) | - | - | 0.8 | 1.2 |
| 73 STU/NIKI | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k[M]/k_{ref}$: $1.0\times10^{-3}$; $k_{ref}$: $O + NO_2 \rightarrow O_2 + NO$ | | | | | | |
| 73 CAS/SCH $k/k_{ref}$: 0.006 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O + O_3 \rightarrow O_2 + O_2$; $M=O_2, N_2$ (AT 3340Å) | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 6.0(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k. | | | | | | |
| 74 SNE REACTION ORDER: 3 | 295 | 1.8(+14) | - | - | 0.9 | 1.1 |
| 75 GAE/TRO REACTION ORDER: 2 M: $N_2$ | 290 | 1.7(+12) | - | - | 0.6 | 1.4 |
| NOTE: LIMITING HIGH-PRESSURE k (REEVALUATION) | | | | | | |
| 75 HIP/SCH M: $N_2$ | 295 | 1.7(+12) | - | - | 0.6 | 1.4 |
| NOTE: LIMITING HIGH-PRESSURE k(REEVALUATION) | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 295 | 2.3(+14) | - | - | 0.6 | 1.4 |
| NOTE: LIMITING LOW-PRESSURE k.(REEVALUATION) | | | | | | |
| 76 HOG/BUR M: $O_2$ | 300 | 2.3(+14) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O + O_2 + M \rightarrow O_3 + M^*$ | | | | | | |
| OXYGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 71 FIN/SNE REACTION ORDER: 3 | 283-321 | 3.2(+11) | 0 | 1680 | | |
| NOTE: $M^* = O_2^*(^1\Delta_g)$ | | | | | | |
| --- | | | | | | |
| $O + O_2 + M \rightarrow O_3^\ddagger + M$ | | | | | | |
| OXYGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 73 BEV/JOH REACTION ORDER: 3 M: $O_2$ | 295 | 2.0(+14) | - | - | 0.9 | 1.1 |
| M: Ar | 295 | 9.8(+13) | - | - | 0.9 | 1.1 |
| M: $SF_6$ | 295 | 1.1(+15) | - | - | 0.9 | 1.1 |
| M: $N_2O$ | 295 | 4.7(+14) | - | - | 0.9 | 1.1 |
| M: $CO_2$ | 295 | 4.8(+14) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $O + O_2 + M \rightarrow O_3^\ddagger(v1,v3) + M$ | | | | | | |
| OXYGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 73 RCS/TRA REACTION ORDER: 3 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O_3^\ddagger(v1,v3) + M \rightarrow O_3 + M$; $k/k_{ref}$: $1.5 \times 10^{-20}$ $cm^{-3}$ | | | | | | |
| --- | | | | | | |
| $O + O_2 + M \rightarrow O_3^\ddagger(v=n) + M$ | | | | | | |
| OXYGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 74 RCS/TRA REACTION ORDER: 3 | 300 | 1.1(+4) | - | - | 0.8 | 1.2 |
| NOTE: M=O2, OR $N_2$ | | | | | | |
| --- | | | | | | |
| $O + O_3 \rightarrow O_2 + O_2$ | | | | | | |
| OXYGEN ATOM + OZONE | | | | | | |
| 71 KEE/SIM REACTION ORDER: 2 | 197-299 | 7.2(+12) | 0 | 2165±100 | 0.8 | 1.2 |
| 72 BUS/KIR1 | 300 | 7.8(+9) | - | - | 0.6 | 1.4 |
| 72 BAL/EG4 | 292-370 | 7.1(+12) | 0 | 1935±85 | 0.8 | 1.3 |
| 72 MCC/KAU | 269-409 | 6.3(+12) | 0 | 2170±50 | 0.8 | 1.2 |
| 73 DAV/WON | 220-353 | 1.2(+13) | 0 | 2276±106 | 0.9 | 1.1 |
| 76 DAV | 293 | 7.2(+9) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $O^*(^1D) + O_3 \rightarrow O_2 + O_2$ | | | | | | |
| OXYGEN ATOM + OZONE | | | | | | |
| 71 GOI/GRE REACTION ORDER: 2 $k/k_{ref}$: 4.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ (AT 2288Å) | | | | | | |
| $k/k_{ref}$: 2.6 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ (AT 2537Å) | | | | | | |
| 73 BEI/HUS1 | 300 | 1.6(+14) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 3.9 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $O^*(^1D) + O_3 \rightarrow O_2 + O_2$ (OR $O + O + O_2$) | | | | | | |
| OXYGEN ATOM + OZONE | | | | | | |
| 75 GAU/SNE REACTION ORDER: 2 $k/k_{ref}$: 8.0 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $O^*(^1D) + O_2 \rightarrow O + O_2^*(^1\Sigma_g^+)$ | | | | | | |
| --- | | | | | | |
| | 300 | 3.6(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 76 DAV/SAD | 298 | 1.4(+14) | - | - | 0.9 | 1.1 |
| 76 STR/HOW | 103-393 | 1.4(+14) | 0 | 0 | 0.9 | 1.1 |
| --- | | | | | | |
| $O + H \rightarrow OH(v=1)$ | | | | | | |
| OXYGEN ATOM + HYDROGEN ATOM | | | | | | |
| 76 TIC REACTION ORDER: 2 | 298 | 2.7(+1) | - | - | | |
| --- | | | | | | |
| $O + H + M \rightarrow OH + M$ | | | | | | |
| OXYGEN ATOM + HYDROGEN ATOM | | | | | | |
| 76 TIC M: H | 298 | 5.8(+11) | - | - | | |
| M: $H_2$ | 298 | 6.2(+9) | - | - | | |
| --- | | | | | | |
| $O + H + M \rightarrow OH(v=1) + M$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| OXYGEN ATOM + HYDROGEN ATOM<br>76 TIC — REACTION ORDER: 3 M: H | 298 | 1.5(+10) | - | - | | |
| $O + H + M \rightarrow OH^{*} + M$<br>OXYGEN ATOM + HYDROGEN ATOM<br>76 REI/MSR — REACTION ORDER: 3 | 1250-2000 | 1.0(+9) | 0 | 5540 | | |
| $O + H_2 \rightarrow OH + H$<br>OXYGEN ATOM + HYDROGEN MOLECULE<br>71 BRA/BLL1 — REACTION ORDER: 2 | 1200-1600 | 3.0(+13) | 0 | 4930±650 | 0.8 | 1.2 |
| 72 SCH/GET — $k/k_{ref}$: 4.0 | 1700-2000 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $H + O_2 \rightarrow OH + O$ | 1700 | 4.5(+12) | - | - | | |
| NOTE: EVALUATION<br>73 GET | 1400-1900 | 3.2(+14) | 0 | 7550 | 0.7 | 1.3 |
| 74 NAM/TRO | 339-924 | 7.2(+10) | - | - | | |
| NOTE: E NOT DETERMINED. WITHIN THE GIVEN T RANGE, TOTAL k INCREASED FROM $7.2\times10^{10}$ TO $1.3\times10^{11}$ $cm^3 mol^{-1} s^{-1}$<br>74 RAW/GAR | 1200-2000 | - | - | - | | |
| NOTE: $OH + OH \rightarrow H_2O + O$; $k/k_{ref}$: $2.9\exp(-3250/T)$ | 1200-2000 | 1.6(+14) | 0 | 6810 | | |
| NOTE: REEVALUATION<br>74 SCH/GET — $k/k_{ref}$: 3.6 | 1400-1900 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_2 + H \rightarrow O + OH$ | 1400-1900 | 2.2(+14) | 0 | 6920 | 0.8 | 1.3 |
| NOTE: EVALUATION<br>75 CAM/HAN2 | 363-490 | 3.1(+13) | 0 | 4950±300 | 0.8 | 1.2 |
| 75 DIB/MCK | 347-832 | 5.3(+12) | 0 | 4200±240 | 0.4 | 1.6 |
| NOTE: BY AIR AFTERGLOW | 347-832 | 5.0(+12) | 0 | 4330±240 | 0.5 | 1.5 |
| NOTE: BY RESONANCE-FLUORESCENCE | | | | | | |
| $O + D_2 \rightarrow OD + D$<br>OXYGEN ATOM + DEUTERIUM MOLECULE<br>75 APP/APP — REACTION ORDER: 2 | 1700-3100 | 4.1(+10) | 1.0 | 8255 | 0.5 | 2.0 |
| $O + H_2(v=1) \rightarrow OH + H$<br>OXYGEN ATOM + HYDROGEN MOLECULE<br>75 BIR/KAS — REACTION ORDER: 2 | 300 | <6.0(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O^{*}(^1D) + H_2 \rightarrow OH + H$<br>OXYGEN ATOM + HYDROGEN MOLECULE<br>73 HEI/HUS2 — REACTION ORDER: 2 | 300 | 1.6(+14) | - | - | 0.9 | 1.1 |
| 73 HEI/HUS2 — $k/k_{ref}$: 1.23 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^{*}(^1D) + N_2O \rightarrow$ products<br>75 GAU/SNE — $k/k_{ref}$: 4.0 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O^{*}(^1D) + O_2 \rightarrow O + O_2^{*}(^1\Sigma_g^{+})$ | 300 | 1.8(+14) | - | - | | |
| NOTE: EVALUATION<br>75 STI/PAY — $k/k_{ref}$: 4.23 | 300 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $O^{*}(^1D) + O_2 \rightarrow O(^3P) + O_2$ | 300 | 1.5(+14) | - | - | 0.4 | 1.6 |
| NOTE: EVALUATION<br>76 DAV/SAD | 298 | 7.8(+13) | - | - | 0.9 | 1.1 |
| 77 DAV/SCH | 204-352 | 6.0(+13) | 0 | 0 | 0.7 | 1.3 |
| $O^{*}(^1D) + D_2 \rightarrow OD + D$<br>OXYGEN ATOM + DEUTERIUM MOLECULE<br>76 DAV/SAD — REACTION ORDER: 2 | 298 | 7.8(+13) | - | - | 0.9 | 1.1 |
| 73 HEI/HUS2 | 300 | 1.1(+14) | - | - | 0.9 | 1.1 |
| $O + OH \rightarrow O_2 + H$<br>OXYGEN ATOM + HYDROXYL FREE RADICAL<br>77 CAM/HAN — REACTION ORDER: 2 $k/k_{ref}$: 260. | 425 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$<br>77 CAM/HAN | 425 | 2.7(+13) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION | | | | | | |
| $O + OH(v=1) \rightarrow O_2 + H$ | | | | | | |
| OXYGEN ATOM + HYDROXYL FREE RADICAL | | | | | | |
| 77 SPE/LND REACTION ORDER: 2 | 295 | 5.4(+13) | - | - | 0.7 | 1.3 |
| 77 SPE/GLA | 295 | 6.3(+13) | - | - | 0.5 | 1.5 |
| $O + OH^{\ddagger}(v=9) \rightarrow$ products. | | | | | | |
| OXYGEN ATOM + HYDROXYL FREE RADICAL | | | | | | |
| 76 KRI REACTION ORDER: 2 | 298 | 1.8(+13) | - | - | | |
| $O + HO_2 \rightarrow OH + O_2$ | | | | | | |
| OXYGEN ATOM + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 PEE/WAH REACTION ORDER: 2 | 1600 | 5.0(+13) | - | - | | |
| NOTE: TENTATIVE k | | | | | | |
| 77 BUK/HAR | 293 | 2.1(+13) | - | - | 0.7 | 1.3 |
| $O + H_2O \rightarrow OH + OH$ | | | | | | |
| OXYGEN ATOM + WATER | | | | | | |
| 71 ALE/HOY REACTION ORDER: 2 | 753-1045 | 4.0(+13) | 0 | 8700±250 | | |
| $O^*(^1D) + H_2O \rightarrow OH + OH$ | | | | | | |
| OXYGEN ATOM + WATER | | | | | | |
| 71 SCO/CVE REACTION ORDER: 2 | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ | | | | | | |
| 72 FOR/SNE $k/k_{ref}$: 3.5 | 295 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2 \rightarrow O + N_2$ | | | | | | |
| 72 SIM/HEI2 | 300-423 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + CO \rightarrow O(^3P) + CO$ | | | | | | |
| $k/k_{ref}$: $3.8 \times 10^{-1} \exp(624/T)$ (EVALUATION) | | | | | | |
| 73 HEI/HUS1 | 300 | 1.8(+14) | - | - | 0.9 | 1.1 |
| 73 HEI/HUS1 $k/k_{ref}$: 4.4 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow$ products | | | | | | |
| 73 SIM/HEI2 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow$ products | | | | | | |
| 75 GAU/SNE $k/k_{ref}$: 5.0 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow O + O_2^*(^1\Sigma_g^+)$ | | | | | | |
| 75 GAU/SNE | 300 | 2.2(+14) | - | - | | |
| NOTE: EVALUATION | 298 | 1.3(+14) | - | - | 0.5 | 1.5 |
| 76 DAV/SAD | 253-353 | 1.4(+14) | 0 | 0 | 0.9 | 1.1 |
| 76 STR/HOW | | | | | | |
| $O^*(^1D) + H_2O_2 \rightarrow OH + HO_2$ | | | | | | |
| OXYGEN ATOM + HYDROGEN PEROXIDE | | | | | | |
| 76 FLE/HUS REACTION ORDER: 2 | 300 | 3.1(+14) | - | - | 0.9 | 1.1 |
| $O + H_2O_2 \rightarrow OH + HO_2 + O_2 + H_2O$ | | | | | | |
| OXYGEN ATOM + HYDROGEN PEROXIDE | | | | | | |
| 71 ALE/FOY REACTION ORDER: 2 | 370-800 | 2.6(+13) | 0 | 3220±300 | | |
| 74 DAV/WON | 283-368 | 1.7(+12) | 0 | 2125±261 | 0.9 | 1.1 |
| $O + SO + M \rightarrow SO_2 + M$ | | | | | | |
| OXYGEN ATOM + SULFUR MONOXIDE | | | | | | |
| 71 MIY/TAKI REACTION ORDER: 3 M: Ar | 298 | 7.3(+16) | - | - | 0.9 | 1.1 |
| $O + SO_2 + M \rightarrow SO_3 + M$ | | | | | | |
| OXYGEN ATOM + SULFUR DIOXIDE | | | | | | |
| 74 ATK/PIT3 REACTION ORDER: 3 M: $N_2O$ | 299-392 | 3.3(+16) | 0 | 1000±200 | | |
| 75 WES/DEH2 M: He | 297 | 3.0(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: He(1.0) M: $SO_2$ | 297 | 2.9(+15) | - | - | 0.7 | 1.3 |
| NOTE: M eff: $SO_2$(9.5) | | | | | | |
| 75 WES/DEH2 M: $N_2$ | 297 | 7.2(+14) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in $^{o}K$) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: M eff: $N_2$(2.4) M: He | 248-415 | 3.9(+16) | 0 | 1400±50 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $O + SO_3 \rightarrow O_2 + SO_2$ | | | | | | |
| OXYGEN ATOM + SULFUR TRIOXIDE | | | | | | |
| 71 MER/LEV REACTION ORDER: 2 | 1100-1400 | 6.5(+14) | 0 | 5435 | | |
| NOTE: k DETERMINED IN $H_2S$ FLAME | 900-1600 | 2.8(+14) | 0 | 6040 | | |
| NOTE: k DETERMINED IN COS FLAME | | | | | | |
| ---------- | | | | | | |
| $O + SO_3 \rightarrow O_2 + SO_2$ | | | | | | |
| OXYGEN ATOM + SULFUR TRIOXIDE | | | | | | |
| 72 JAC/WIN REACTION ORDER: 2 | 300-500 | 1.5(+8) | 0 | 500 | | |
| ---------- | | | | | | |
| $O + SO_3 + M \rightarrow O_2 + SO_2 + M$ | | | | | | |
| OXYGEN ATOM + SULFUR TRIOXIDE | | | | | | |
| 75 WES/DEH1 REACTION ORDER: 3 M: He | 298 | 7.3(+17) | - | - | 0.9 | 1.1 |
| NOTE: M eff: He(1.0) M: $SO_2$ | 298 | <7.3(+18) | - | - | | |
| 75 WES/DEH1 | | | | | | |
| NOTE: M eff: $SO_3$(<10.0); UPPER LIMIT RATIO M: $N_2$ | 298 | 1.0(+18) | - | - | 0.9 | 1.1 |
| 75 WES/DEH1 | | | | | | |
| NOTE: M eff: $N_2$(1.4) M: He | 298-507 | 5.0(+16) | 0 | -785 | 0.9 | 1.1 |
| 75 WES/DEH1 | | | | | | |
| ---------- | | | | | | |
| $O + S_2O \rightarrow SO + SO$ | | | | | | |
| OXYGEN ATOM + SULFUR OXIDE ($S_2O$) | | | | | | |
| 74 STE/ALV REACTION ORDER: 2 | 298 | 9.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $O + SH \rightarrow H + SO$ | | | | | | |
| OXYGEN ATOM + MERCEPTO FREE RADICAL | | | | | | |
| 75 CUP/GLA REACTION ORDER: 2 | 295 | 9.6(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $O + H_2S \rightarrow OH + SH$ | | | | | | |
| OXYGEN ATOM + HYDROGEN SULFIDE | | | | | | |
| 76 WHY/TIM REACTION ORDER: 2 | 263-495 | 4.4(+12) | 0 | 1660±50 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + D_2S \rightarrow OD + SD$ | | | | | | |
| OXYGEN ATOM + HYDROGEN SULFIDE ($D_2S$) | | | | | | |
| 76 WHY/TIM REACTION ORDER: 2 | 298-450 | 6.3(+12) | 0 | 2145±155 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $O + N \rightarrow NO^*(C,v=0)$ | | | | | | |
| OXYGEN ATOM + NITROGEN ATOM | | | | | | |
| 73 MAN/CAR REACTION ORDER: 2 | 300 | 1.7(+6) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $O + N + M \rightarrow NO + M$ | | | | | | |
| OXYGEN ATOM + NITROGEN ATOM | | | | | | |
| 73 CAM/GRA REACTION ORDER: 3 M: $N_2$ | 196-298 | 2.0(+15) | 0 | -155 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES k (196)=(4.38±0.38)X$10^9$ AND k(298)=(3.34±0.36)$10^9 dm^6 mol^{-2} s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| $O + N_2 \rightarrow NO + N$ | | | | | | |
| OXYGEN ATOM + NITROGEN MOLECULE | | | | | | |
| 73 BAC/EBE REACTION ORDER: 2 | 1900-2250 | 5.0(+13) | 0 | 37950 | 0.5 | 2.0 |
| 73 IVE/BAS | 1900-2400 | 1.3(+14) | 0 | 37950 | | |
| NOTE: EVALUATION | | | | | | |
| 76 BAR/NAS | 2270-2620 | 9.1(+13) | 0 | 38000 | 0.9 | 1.1 |
| 77 BIA/SME | 1880-2350 | 7.5(+13) | 0 | 38250 | 0.8 | 1.2 |
| 77 MON/BAN2 | 2384-3850 | 1.8(+14) | 0 | 38375 | 0.7 | 1.4 |
| ---------- | | | | | | |
| $O + N_2 \rightarrow N_2O$ | | | | | | |
| OXYGEN ATOM + NITROGEN MOLECULE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 1.0(+12) | - | - | | |
| NOTE: GIVEN WITH CAUTION. RATE CONSTANT EXPRESSED AS: $k=[N_2]\ 1.0X10^{12} cm^6 mol^{-2} s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| $O^*(^1D) + N_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + NITROGEN MOLECULE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 HEI/HUS1 REACTION ORDER: 2 | 300<br>300 | 4.2(+13)<br>- | -<br>- | -<br>- | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + N_2 + M \rightarrow N_2O + M$ | | | | | | |
| OXYGEN ATOM + NITROGEN MOLECULE | | | | | | |
| 71 STU/NIK1 REACTION ORDER: 3 M: $N_2$ | 300 | <1.8(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $O^*(^1D) + N_2 + M \rightarrow N_2O + M$ | | | | | | |
| OXYGEN ATOM + NITROGEN MOLECULE | | | | | | |
| 72 SIM/LIS REACTION ORDER: 3 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2 \rightarrow O + N_2$ (RATIO IN $cm^3mol^{-1}$ UNITS); M = $N_2$ | | | | | | |
| ---------- | | | | | | |
| $O + NO \rightarrow O_2 + N$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE (NO) | | | | | | |
| 74 HAN/FLO REACTION ORDER: 2 | 2500-4100 | 2.4(+9) | 1.0 | 19446 | | |
| ---------- | | | | | | |
| 76 MCC/KRU | 1700-2300<br>1500-5000 | 1.7(+9)<br>3.7(+9) | 0<br>1.0 | 19447<br>20850 | 0.8 | 1.3 |
| NOTE: RECOMMENDED k | | | | | | |
| ---------- | | | | | | |
| $O^*(^1D) + NO \rightarrow O_2 + N$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE (NO) | | | | | | |
| 73 HEI/HUS2 REACTION ORDER: 2 $k/k_{ref}$: 0.43 | 300<br>300 | 5.1(+13)<br>- | -<br>- | -<br>- | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + NO + M \rightarrow NO_2 + M$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE (NO) | | | | | | |
| 71 ATK/CVE REACTION ORDER: 3 M: $N_2O$ | 298 | 3.7(+16) | - | - | 0.8 | 1.2 |
| 71 STU/NIK1 M: He | 300 | 2.4(+16) | - | - | 0.9 | 1.1 |
| M: NO | 300 | 5.4(+16) | - | - | 0.9 | 1.1 |
| 72 ATK/CVE M: $N_2O$ | 298-473 | 2.6(+15) | 0 | -805±150 | 0.8 | 1.2 |
| 73 GAF/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 8.0(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 74 ATK/PIT1 REACTION ORDER: 3 M: $N_2O$ | 300-392 | 9.6(+15) | 0 | -450±100 | | |
| 74 ATK/PIT2 M: $N_2O$ | 300 | 4.3(+16) | - | - | 0.9 | 1.1 |
| 74 FUR/ATK M: $N_2O$ | 298 | 5.8(+16) | - | - | 0.9 | 1.1 |
| 75 CAM/HAN2 REACTION ORDER: 3 M: Ar | 285-432 | 1.1(+15) | 0 | -900±85 | 0.7 | 1.3 |
| NOTE: M eff: Ar(1.0) | | | | | | |
| M: $N_2$ | 285-432 | 1.8(+15) | 0 | -900±85 | 0.7 | 1.3 |
| NOTE: M eff: $N_2$(1.62±0.14) | | | | | | |
| 75 GAE/TRO REACTION ORDER: 2 M: $N_2$ | 296 | 1.8(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 75 BIE/SCH M: $N_2$ | 295 | 1.8(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH PRESSURE k(REEVALUATION) | | | | | | |
| M: $N_2$ | 295 | 2.7(+16) | - | - | 0.8 | 1.2 |
| NOTE: M eff: $N_2$(1.0) LIMITING LOW PRESSURE k (REEVALUATION) | | | | | | |
| 75 SIN/FUR M: $N_2O$ | 298-473 | 6.1(+15) | 0 | -620±28 | 0.9 | 1.1 |
| 76 MIC/PAY M: He | 217-500 | 3.9(+15) | 0 | -523±30 | 0.9 | 1.1 |
| NOTE: M eff: (He): 0.87 (217K); 0.95 (298K); 1.0(500K) | | | | | | |
| M: Ne | 217-500 | 3.4(+15) | 0 | -518±30 | 0.9 | 1.1 |
| NOTE: M eff: (Ne): 0.74 (217K); 0.8 (298K); 0.9 (500K) | | | | | | |
| M: Ar | 217-500 | 3.3(+15) | 0 | -594±35 | 0.9 | 1.1 |
| NOTE: M eff(Ar): 1.0(217-500K) | | | | | | |
| M: Kr | 217-500 | 3.5(+15) | 0 | -574±35 | 0.9 | 1.1 |
| NOTE: M eff(Kr): 0.97 (217K); 0.99 (298K); 1.0 (500K) | | | | | | |
| ---------- | | | | | | |
| 76 WHY/MIC1 M: $N_2$ | 217-500 | 5.6(+15) | 0 | -584±35 | 0.9 | 1.1 |
| 76 WHY/MIC1 M: $N_2$ | 217-500 | 1.4(+21) | -1.82 | 0 | | |
| NOTE: ALTERNATIVE, T DEPENDENT k | | | | | | |
| 77 ATK/PER1 M: Ar | 298-439 | 5.3(+15) | 0 | -473±100 | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| --- | | | | | | |
| $O + NO_2 \rightarrow O_2 + NO$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 72 CLY/CRU REACTION ORDER: 2 | 298 | 3.6(+12) | - | - | 0.9 | 1.1 |
| 72 GEE/DEM | 298 | 4.0(+12) | - | - | 0.8 | 1.3 |
| 73 LAV/BER | 230-339 | 5.5(+12) | 0 | 0 | 0.9 | 1.1 |
| 73 STA/WOO | 249 | 6.3(+12) | - | - | 0.8 | 1.2 |
| 73 STA/WOO | 296 | 5.6(+12) | - | - | 0.8 | 1.2 |
| 73 BAR/JOH | 296 | 5.5(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 74 BEM/CLY | 298 | 5.7(+12) | - | - | 0.9 | 1.1 |
| | 298-1055 | 1.1(+14) | -0.52 | 0 | 0.7 | 1.4 |
| 74 STE/ALV $k/k_{ref}$: 6.0 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O + S_2O \rightarrow SO + SO$ | | | | | | |
| --- | | | | | | |
| $O^*(^1D) + NO_2 \rightarrow O_2 + NO$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 73 HEI/HUS2 REACTION ORDER: 2 $k/k_{ref}$: 1.05 | 300 | 1.4(+14) | - | - | 0.9 | 1.1 |
| | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow$ products | | | | | | |
| 75 GAU/SNE $k/k_{ref}$: ~4.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow O + O_2^*(^1\Sigma_g^+)$ APPROXIMATE RATIO | | | | | | |
| NOTE: EVALUATION (APPROXIMATE k) | | | | | | |
| --- | | | | | | |
| $O + NO_2 + M \rightarrow NO_3 + M$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 73 HUI REACTION ORDER: 3 M: Ar | 263 | 1.4(+17) | - | - | 0.7 | 1.3 |
| 73 HUI M: Ar | 298 | 7.6(+16) | - | - | 0.7 | 1.3 |
| 73 BAR/JOH M: $N_2$ | 296 | 3.9(+16) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 6.0(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 75 GAE/TRO M: $N_2$ | 296 | 1.3(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 75 HIP/SCH M: $N_2$ | 295 | 1.3(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k (REEVALUATION) | | | | | | |
| M: $N_2$ | 295 | 2.9(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $N_2$(1.0) LIMITING LOW-PRESSURE k (REEVALUATION) | | | | | | |
| --- | | | | | | |
| $O + NO_3 \rightarrow O_2 + NO_2$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 75 GEA REACTION ORDER: 2 | 298-329 | 6.0(+12) | 0 | 0 | 0.8 | 1.2 |
| --- | | | | | | |
| $O + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 72 SEL REACTION ORDER: 2 | 1000-3000 | 4.5(+13) | 0 | 12130 | | |
| 76 MIL | 1370-1655 | - | - | - | | |
| NOTE: $k_{ref}$: $O + N_2O \rightarrow NO + NO$; $k/k_{ref}$: $3.63 \times 10^4 cm^3 mol^{-1}$ | | | | | | |
| 75 BAB/DEA | 1850-2539 | 1.2(+13) | 0 | 12630 | | |
| 76 DEA | 1950-3075 | 1.2(+13) | 0 | 12630 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $O^*(^1D) + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 71 GOL/GRE REACTION ORDER: 2 $k/k_{ref}$: 0.33 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ (AT 2288Å) | | | | | | |
| $k/k_{ref}$: 0.37 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ (AT 2537Å) | | | | | | |
| 72 GRE $k/k_{ref}$: 0.59 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow NO + NO$; | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| FOR COMPLETELY THERMALIZED $O^*(^1D)$ $k/k_{ref}$=0.85±0.05 | | | | | | |
| 72 SIM/GRE $k/k_{ref}$: 0.65 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow NO + NO$ (RATE RATIO VALID FOR $O^*(^1D)$ ATOMS WITH TRANSLATIONAL ENERGY IN EXCESS OF 10 kcal/mole | | | | | | |
| $k/k_{ref}$: 0.90 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow NO + NO$ (RATE RATIO VALID FOR $O^*(^1D)$ ATOMS WITH NO EXCESS THERMAL ENERGY | | | | | | |
| 73 GHF/ELL $k/k_{ref}$: 0.70 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow NO + NO$ | | | | | | |
| 74 WIE/PAR $k/k_{ref}$: 1.0 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow NO + NO$ | | | | | | |
| --- | | | | | | |
| $O + N_2O \rightarrow N_2 + O_2 + NO + NO$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 75 DOV/NIP REACTION ORDER: 2 | 2160-3400 | 5.2(+13) | 0 | 12557 | 0.5 | 2.0 |
| --- | | | | | | |
| $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 72 ICU/CVE REACTION ORDER: 2 $k/k_{ref}$: 1.25 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + CO_2 \rightarrow O + CO_2$ | | | | | | |
| 72 PAR/SYM $k/k_{ref}$: 0.145 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + (CH_3)_4C \rightarrow$ products | | | | | | |
| 73 GHO/ELL $k/k_{ref}$: 3.23 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow O + O_2$ | | | | | | |
| | 298 | 1.2(+14) | - | - | | |
| NOTE: EVALUATION | 300 | 1.3(+14) | - | - | 0.9 | 1.1 |
| 75 GAU/SNE $k/k_{ref}$: 3.3 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow O + O_2^*(^1\Sigma_g^+)$ | | | | | | |
| | 300 | 1.4(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 76 DAV/SAD | 298 | 8.4(+13) | - | - | 0.9 | 1.1 |
| 77 DAV/SCH | 204-359 | 6.6(+13) | 0 | 0 | 0.8 | 1.2 |
| $O + N_2O \rightarrow NO + NO$ | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 72 SOL REACTION ORDER: 2 | 1000-3000 | 4.5(+13) | 0 | 12130 | | |
| 73 LIP/MIL REACTION ORDER: 2 | 1300-1950 | - | - | - | | |
| NOTE: $k_{ref}$: $O + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| 73 MII/MAT $k/k_{ref}$: 0.32 | 1169-1650 | - | - | - | | |
| NOTE: $k_{ref}$: $O + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| 75 EAB/DEA | 1850-2535 | 1.2(+13) | 0 | 12630 | | |
| 76 DEA | 1950-3075 | 1.2(+13) | 0 | 12630 | | |
| NOTE: EVALUATION | | | | | | |
| 76 MIL $k/k_{ref}$: 0.252 | 1216-1655 | - | - | - | | |
| NOTE: $k_{ref}$: $O + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| 77 MON/HAN1 | 1815-3365 | 6.2(+13) | 0 | 12350 | 0.6 | 1.7 |
| --- | | | | | | |
| $O^*(^1S) + N_2O \rightarrow$ products | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 76 SLA/BLA2 REACTION ORDER: 2 | 200-368 | 2.3(+13) | 0 | 432±75 | 0.7 | 1.3 |
| --- | | | | | | |
| $O + N_2O_5 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + NITROGEN OXIDE ($N_2O_5$) | | | | | | |
| 75 GRA REACTION ORDER: 2 | 298 | <1.2(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| O + $NH_2$ → OH + NH + H + HNO (overall) | | | | | | |
| OXYGEN ATOM + AMIDOGEN FREE RADICAL | | | | | | |
| 73 GEH/HOY REACTION ORDER: 2 | 298 | 2.1(+12) | - | - | | |
| O + $NH_3$ → OH + $NH_2$ | | | | | | |
| OXYGEN ATOM + AMMONIA | | | | | | |
| 74 DEV/NIP REACTION ORDER: 2 | 1620-1920 | <1.0(+13) | 0 | 3320 | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O^*(^1D)$ + $NH_3$ → OH + $NH_2$ | | | | | | |
| OXYGEN ATOM + AMMONIA | | | | | | |
| 76 DAV/SAD REACTION ORDER: 2 | 298 | 2.0(+14) | - | - | 0.9 | 1.1 |
| 76 FLE/HUS | 300 | 4.0(+14) | - | - | 0.9 | 1.1 |
| 77 DAV/SCH REACTION ORDER: 2 | 204-354 | 1.5(+14) | 0 | 0 | 0.8 | 1.2 |
| O + $HONO_2$ → OH + $NO_3$ | | | | | | |
| OXYGEN ATOM + NITRIC ACID | | | | | | |
| 72 MCR/SMI REACTION ORDER: 2 | 300 | <7.8(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 74 CHA/WAY | 300 | <1.8(+7) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O^*(^1D)$ + CO → $CO_2$ | | | | | | |
| OXYGEN ATOM + CARBON MONOXIDE | | | | | | |
| 73 HEI/HUSI REACTION ORDER: 2 | 300 | 4.4(+13) | - | - | 0.9 | 1.1 |
| REACTION ORDER: 2 $k/k_{ref}$: 1.05 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D)$ + $O_2$ → products | | | | | | |
| O + CO + M → $CO_2$ + M | | | | | | |
| OXYGEN ATOM + CARBON MONOXIDE | | | | | | |
| 71 MIY/TAKI REACTION ORDER: 3 M: Ar | 298 | 2.1(+16) | - | - | 0.7 | 1.3 |
| 71 STU/NIKI M: He | 300 | 6.2(+11) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 300 | 8.0(+11) | - | - | 0.7 | 1.3 |
| M: CO | 300 | 1.2(+12) | - | - | 0.7 | 1.3 |
| 72 BAL/JAC M: Ar | 300-3500 | 3.0(+14) | 0 | 1510 | | |
| NOTE: EVALUATION | | | | | | |
| O + CO + M → $CO_2$ + M | | | | | | |
| OXYGEN ATOM + CARBON MONOXIDE | | | | | | |
| 72 DEM REACTION ORDER: 2 M: $CO_2$ | 298 | 9.8(+7) | - | - | | |
| NOTE: k INCREASING FROM $9.8\times10^7$ TO $3.5\times10^8$ $cm^3mol^{-1}s^{-1}$ BETWEEN 0.74 AND 42 ATM. PRESSURE. | | | | | | |
| REACTION ORDER: 2 M: $CO_2$ | 298 | 5.2(+7) | - | - | | |
| NOTE: k INCREASING FROM $5.2\times10^7$ TO $2.8\times10^8$ $cm^3mol^{-1}s^{-1}$ BETWEEN 0.74 AND 42 ATM. PRESSURE. | | | | | | |
| 72 SIM/HEI1 REACTION ORDER: 2 M: $N_2O$ | 298-472 | 1.6(+10) | 0 | 1460 | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: $N_2O$ | 298-472 | 5.9(+15) | 0 | 2065 | | |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| 72 SIA/WOO M: $N_2$ | 296 | 8.3(+11) | - | - | 0.8 | 1.2 |
| M: CO | 250-370 | 2.4(+15) | 0 | 2185±275 | 0.8 | 1.2 |
| M: $CO_2$ | 296 | 2.2(+12) | - | - | 0.9 | 1.1 |
| 72 ZAB/HAR | 1400-1500 | <2.0(+14) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 M: CO | 300 | <3.0(+8) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE UPPER LIMIT k | | | | | | |
| 73 INN REACTION ORDER: 3 M: Ar | 296 | 3.6(+12) | - | - | 0.8 | 1.2 |
| M: CO | 296 | 1.6(+12) | - | - | 0.8 | 1.2 |
| M: $CO_2$ | 296 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 74 HAR/VAS M: Ar | 1500 | <2.0(+14) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 74 INN M: $CO_2$ | 257-277 | 8.0(+14) | 0 | 1780±410 | | |
| 74 KEN M: $O_2$ | 400-500 | 2.4(+12) | 0 | -1860 | | |
| NOTE: REEVALUATION | | | | | | |
| 74 WAG/ZAB M: Ar | 298-4000 | 1.0(+19) | -1.5 | 2520 | | |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| 76 WEI | 2500-2900 | 3.0(+18) | -1.0 | 2000 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O + CO_2 \rightarrow O_2 + CO$ | | | | | | |
| OXYGEN ATOM + CARBON DIOXIDE | | | | | | |
| 74 BAE/DEA REACTION ORDER: 2 | 3015-4675 | 4.8(+12) | 0 | 18170±1460 | 0.6 | 1.6 |
| ---------- | | | | | | |
| $O^*(^1D) + CO_2 \rightarrow O_2^* + CO$ | | | | | | |
| OXYGEN ATOM + CARBON DIOXIDE | | | | | | |
| 73 HEI/HUS1 REACTION ORDER: 2 | 300 | 1.3(+14) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 3.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + CO_2 + M \rightarrow CO_3 + M$ | | | | | | |
| OXYGEN ATOM + CARBON DIOXIDE | | | | | | |
| 71 STU/NIK$_1$ REACTION ORDER: 3 | 300 | <3.3(+12) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $O + CH_2$: $\rightarrow CO + H + H$ | | | | | | |
| OXYGEN ATOM + METHYLENE FREE RADICAL | | | | | | |
| 73 JON/BAY1 REACTION ORDER: 2 $k/k_{ref}$: 3.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: CH≡CH + $CH_2$: $\rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + CH_3 \rightarrow H + HCHO$ | | | | | | |
| OXYGEN ATOM + METHYL FREE RADICAL | | | | | | |
| 72 NIK/MOR2 REACTION ORDER: 2 | 300 | 5.4(+13) | - | - | | |
| $O + CH_3 \rightarrow H + HCHO$ | | | | | | |
| 73 MOF/NIK$_1$ | 298 | >1.8(+13) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298K LOWER LIMIT k | | | | | | |
| 73 PEE/MAH1 | 1100-1900 | 1.3(+14) | 0 | 1000 | | |
| 73 WAS/BAY | 297 | 7.4(+13) | - | - | | |
| 74 SLA/PRU | 300 | 1.1(+14) | - | - | 0.8 | 1.2 |
| 75 EIG/LAZ | 1550-1725 | 1.1(+14) | 0 | 0 | | |
| 76 TSU | 1500-2000 | 6.0(+13) | 0 | 0 | | |
| 76 WAS/BAY | 254-341 | 6.0(+13) | 0 | 0 | 0.8 | 1.2 |
| 75 BOW | 1900-2400 | 1.0(+14) | 0 | 0 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| ---------- | | | | | | |
| $O^*(^1D) + CH_4 \rightarrow H_2 + HCHO$ | | | | | | |
| OXYGEN ATOM + METHANE | | | | | | |
| 76 JAY/SIM REACTION ORDER: 2 $k/k_{ref}$: 0.11 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O^*(^1D) + CH_4 \rightarrow OH + CH_3$ | | | | | | |
| ---------- | | | | | | |
| $O + CH_4 \rightarrow OH + CH_3$ | | | | | | |
| OXYGEN ATOM + METHANE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 373-583 | 4.2(+13) | 0 | 4630±350 | 0.5 | 1.5 |
| 75 BRA/BRO | 1300-2000 | 1.9(+14) | 0 | 5900 | | |
| 77 KOT/JUS | 1500-2250 | 4.1(+14) | 0 | 7030 | | |
| $O^*(^1D) + CH_4 \rightarrow OH + CH_3$ | | | | | | |
| OXYGEN ATOM + METHANE | | | | | | |
| 72 GRE/HEI REACTION ORDER: 2 $k/k_{ref}$: 2.28 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{REF} = k_2 + k_3$, WHERE $k_2$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| AND $k_3$: $O^*(^1D) + N_2O \rightarrow NO + NO$ | | | | | | |
| $k/k_{ref}$: 1.35 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref} = k_2 + k_3$, WHERE $k_2$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2$ | | | | | | |
| AND $k_3$: $O^*(^1D) + N_2O \rightarrow NO + NO$ WITH ADDED He | | | | | | |
| 73 HEI/HUS2 | 300 | 1.9(+14) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 1.41 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow$ products | | | | | | |
| 75 GAU/SNE $k/k_{ref}$: 5.1 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O^*(^1D) + O_2 \rightarrow O + O_2^*(^1\Sigma_g^+)$ | | | | | | |
| 75 GAU/SNE | 300 | 2.3(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O^*(^1D) + CH_4 \rightarrow OH + CH_3 + H_2 + HCHO$ | | | | | | |
| OXYGEN ATOM + METHANE | | | | | | |
| 76 DAV/SAD REACTION ORDER: 2 | 298 | 7.8(+13) | - | - | 0.8 | 1.2 |
| 77 DAV/SCH | 198-357 | 8.4(+13) | 0 | 0 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $O + CH_4 \rightarrow H_2O + CH_2$ | | | | | | |
| OXYGEN ATOM + METHANE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 373-583 | 3.3(+12) | 0 | 3370±350 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $O + CHO \rightarrow H + CO_2$ | | | | | | |
| OXYGEN ATOM + METHYL, OXO-, FREE RADICAL | | | | | | |
| 72 WES/DEH3 REACTION ORDER: 2 $k/k_{ref}$: 0.73 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O + .CHO \rightarrow OH + CO$ | | | | | | |
| 73 MAC/THR $k/k_{ref}$: 0.46 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $k_1(O + .CHO \rightarrow OH + CO) + k_2(O + .CHO \rightarrow H + CO_2$ | | | | | | |
| ---------- | | | | | | |
| $O + CHO \rightarrow OH + CO$ | | | | | | |
| OXYGEN ATOM + METHYL, OXO-, FREE RADICAL | | | | | | |
| 73 MAC/THR REACTION ORDER: 2 $k/k_{ref}$: 0.54 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $k_1(O + .CHO \rightarrow OH + CO) + k_2(3 + .CHO \rightarrow H + CO_2$ | | | | | | |
| ---------- | | | | | | |
| $O + CHO \rightarrow OH^*(v=9) + CO$ | | | | | | |
| OXYGEN ATOM + METHYL, OXO-, FREE RADICAL | | | | | | |
| 76 KRI REACTION ORDER: 2 | 298 | 3.6(+12) | - | - | | |
| ---------- | | | | | | |
| $O + CHO \rightarrow OH + CO + H + CO_2$ | | | | | | |
| OXYGEN ATOM + METHYL, OXO-, FREE RADICAL | | | | | | |
| 74 WAS/MAR REACTION ORDER: 2 | 297 | 1.3(+14) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $O + HCHO \rightarrow OH + CHO$ | | | | | | |
| OXYGEN ATOM + FORMALDEHYDE | | | | | | |
| 73 MAC/THR REACTION ORDER: 2 | 300 | 9.0(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + HCHO \rightarrow$ products | | | | | | |
| OXYGEN ATOM + FORMALDEHYDE | | | | | | |
| 74 CAD/WIC REACTION ORDER: 2 | | 3.7(+12) | 0 | 1200 | | |
| NOTE: UNSPECIFIED T RANGE NEAR 300 K | | | | | | |
| ---------- | | | | | | |
| $O + CH_3OH \rightarrow OH + .CH_2OH$ | | | | | | |
| OXYGEN ATOM + METHANOL | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 6.0(+12) | 0 | 3320±350 | 0.5 | 1.5 |
| 72 LEE/MEA | 273-438 | 1.7(+12) | 0 | 1150±100 | 0.6 | 1.4 |
| ---------- | | | | | | |
| $O + CH_3OH \rightarrow H_2O + HCHO$ | | | | | | |
| OXYGEN ATOM + METHANOL | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 3.0(+11) | 0 | 1410±350 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $O^*(^1D) + CH_3OH \rightarrow$ products | | | | | | |
| OXYGEN ATOM + METHANOL | | | | | | |
| 75 OSI/SIM REACTION ORDER: 2 | 298-345 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow NO + NO + N_2 + O_2$ | | | | | | |
| ---------- | | | | | | |
| $O + CS \rightarrow CO + S$ | | | | | | |
| OXYGEN ATOM + CARBON MONOSULFIDE FREE RADICAL | | | | | | |
| 71 HAN/SMI REACTION ORDER: 2 | 298 | 8.4(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $O + CS \rightarrow CO(v=n) + S$ | | | | | | |
| OXYGEN ATOM + CARBON MONOSULFIDE FREE RADICAL | | | | | | |
| 72 HAN/RID REACTION ORDER: 2 $k/k_{ref}$: 0.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O + CS \rightarrow CO(v=13) + S$ RATIO INCREASING FROM 0.1 | | | | | | |
| TO 0.9 BETWEEN v=7 AND v=12, THEN DECREASING TO 0.3 | | | | | | |
| FROM v=14 TO v=15 | | | | | | |
| 75 SLA/GRA1 | 305 | 1.2(+13) | - | - | 0.9 | 1.1 |
| 76 BID/BRE | 300 | 1.4(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $O + CS_2 \rightarrow S + COS$ | | | | | | |
| OXYGEN ATOM + CARBON DISULFIDE | | | | | | |
| 74 SLA/GIL REACTION ORDER: 2 $k/k_{ref}$: 0.093 | 302 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: O + $CS_2$ → products<br>77 GRA/GUT $k/k_{ref}$: 0.098 | 240-500 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: O + $CS_2$ → products( WITHIN THE GIVEN T RANGE<br>$k/k_{ref}$ RATIO DECREASES FROM 0.098±0.004<br>TO 0.08±0.007 | 249-500 | 1.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: WITHIN THE GIVEN T RANGE k INCREASES FROM $1.7X10^{11}$<br>TO $5.5X10^{11}$ $cm^3mol^{-1}s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| O + $CS_2$ → SO + CS<br>OXYGEN ATOM + CARBON DISULFIDE<br>71 TAK REACTION ORDER: 2 | 298 | 1.4(+12) | - | - | 0.9 | 1.1 |
| 75 WEI/TIM | 218-293 | 1.7(+13) | 0 | 645±35 | 0.9 | 1.1 |
| ---------- | | | | | | |
| O + $CS_2$ → products<br>OXYGEN ATOM + CARBON DISULFIDE<br>74 SIA/GIL REACTION ORDER: 2 | 302 | 2.4(+12) | - | - | | |
| 77 GRA/GUT | 249-500 | 1.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOR. WITHIN THE GIVEN T RANGE,<br>k INCREASES FROM $1.7X10^{12}$ TO $6.7X10^{12}$ $cm^3mol^{-1}s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| O + COS → CO + SO<br>OXYGEN ATOM + CARBON OXIDE SULFIDE<br>71 KRE/SIM REACTION ORDER: 2 | 300-523 | 9.8(+12) | 0 | 2265 | | |
| 74 KIE/STI | 263-502 | 9.9(+12) | 0 | 2167±28 | 0.9 | 1.1 |
| 75 WEI/TIM | 239-404 | 1.2(+13) | 0 | 2150±35 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $O^*(^1D)$ + COS → CO + SO<br>OXYGEN ATOM + CARBON OXIDE SULFIDE<br>75 GAU/SNE REACTION ORDER: 2 $k/k_{ref}$: 4.1 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $O^*(^1D)$ + $O_2$ → O + $O_2$* ($^1\Sigma_H^+$)<br>75 GAU/SNE | 300 | 1.8(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| O + $CH_3SH$ → HS(O). + $CH_3$ + H + $CH_3S$(O). + $CH_3O$. + $CH_3S$.<br>OXYGEN ATOM + METHANETHIOL<br>76 SIA/GRA REACTION ORDER: 2 | 300 | 1.1(+12) | - | - | | |
| ---------- | | | | | | |
| O + CN → CO + N<br>OXYGEN ATOM + CYANOGEN FREE RADICAL<br>75 ALB/BOY REACTION ORDER: 2 | 298 | 1.2(+13) | - | - | 0.7 | 1.3 |
| NOTE: TEMPERATURE IN DEPENDENT WITHIN THE T RANGE 275-387K<br>77 SCH/WOL | 295 | 1.1(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| O + CN (v=n) → CO + N<br>OXYGEN ATOM + CYANOGEN FREE RADICAL<br>72 SCP/WOL2 REACTION ORDER: 2 | 298 | 8.0(+12) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298K. k UNCHANGED<br>BETWEEN v=0 AND v=5, BUT DECREASING TO<br>$6.0X10^{12}$ $cm^3mol^{-1}s^{-1}$ FOR v=6 | | | | | | |
| 73 SCH/SCH1 | 298 | 1.3(+13) | - | - | | |
| NOTE: N=0 TO 6 | | | | | | |
| ---------- | | | | | | |
| O + CN (v=7) → CO + N<br>OXYGEN ATOM + CYANOGEN FREE RADICAL<br>73 SCH/SCH1 REACTION ORDER: 2 | 298 | 6.3(+13) | - | - | | |
| ---------- | | | | | | |
| O + NCO → NO + CO<br>OXYGEN ATOM + CYANATO FREE RADICAL<br>74 SCH/SCH REACTION ORDER: 2 | 298 | 8.9(+12) | - | - | | |
| ---------- | | | | | | |
| O + $CH_3ONO$ → OH + HCHO + NO<br>OXYGEN ATOM + NITROUS ACID METHYL ESTER<br>75 DAV/THR REACTION ORDER: 2 | 300-410 | 1.4(+13) | 0 | 2620±240 | | |
| ---------- | | | | | | |
| O + $CH_3NO_2$ → $CH_3O$. + $NO_2$ (OR OH + .$CH_2NO_2$)<br>OXYGEN ATOM + METHANE, NITRO-<br>75 CAM/GOO1 REACTION ORDER: 2 | 295 | 1.9(+9) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| O + $C_2O$ → CO + CO | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| OXYGEN ATOM + CARBON OXIDE ($C_2O$) | | | | | | |
| 72 SHA/MAS REACTION ORDER: 2 | 300 | 5.7(+13) | - | - | 0.6 | 1.6 |
| ---------- | | | | | | |
| $O + CH{\equiv}CH \rightarrow CO + CH_2$ | | | | | | |
| OXYGEN ATOM + ETHYNE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | <1.3(+11) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 73 PEE/MAH2 | 1200-1700 | 5.2(+13) | 0 | 1360 | | |
| 77 VAN/VAN | 700-1430 | 6.7(+13) | 0 | 2000 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $O + CH{\equiv}CH \rightarrow$ products | | | | | | |
| OXYGEN ATOM + ETHYNE | | | | | | |
| 71 STU/NIK2 REACTION ORDER: 2 | 300 | 7.8(+10) | - | - | 0.9 | 1.1 |
| 77 WES/DEH | 297 | 7.2(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + CD{\equiv}CD \rightarrow$ products | | | | | | |
| OXYGEN ATOM + ETHYNE-$d_2$ | | | | | | |
| 71 STU/NIK2 REACTION ORDER: 2 | 300 | 7.8(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + CH{\equiv}CH + M \rightarrow CH_2{=}C{=}O + M$ | | | | | | |
| OXYGEN ATOM + ETHYNE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | <1.7(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $O + CH_2{=}CH_2 \rightarrow H_2 + CH_2{=}C{=}O$ | | | | | | |
| OXYGEN ATOM + ETHENE | | | | | | |
| 74 PRU/SLA REACTION ORDER: 2 | 300 | 2.3(+10) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| ---------- | | | | | | |
| $O + CH_2{=}CH_2 \rightarrow CHO + CH_3$ | | | | | | |
| OXYGEN ATOM + ETHENE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 7.0(+11) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| 73 KUR/HUI | 298 | 4.8(+11) | - | - | 0.9 | 1.1 |
| 73 PEE/MAH2 | 1200-1700 | 2.3(+13) | 0 | 1360 | | |
| 74 PRU/SLA $k/k_{ref}$: 0.95 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + Cd_2{=}Cd_2 \rightarrow CDO + CD_3$ | | | | | | |
| OXYGEN ATOM + ETHENE-$d_4$- | | | | | | |
| 73 KUR/HUI REACTION ORDER: 2 | 298 | 4.9(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + CH_2{=}CH_2 \rightarrow HCHO + CH_2$ | | | | | | |
| OXYGEN ATOM + ETHENE | | | | | | |
| 73 PEE/MAH2 REACTION ORDER: 2 | 1200-1600 | 2.5(+13) | 0 | 2520 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $O + CH_2{=}CH_2 \rightarrow cy\text{-}CH_2CH_2O$ | | | | | | |
| OXYGEN ATOM + ETHENE | | | | | | |
| 74 FUP/ATK REACTION ORDER: 2 | 298 | 4.3(+11) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 7.0(+12) | 0 | 845±50 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + ETHENE | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 3.0(+11) | - | - | 0.9 | 1.1 |
| 71 STU/NIK2 | 300 | 3.8(+10) | - | - | 0.9 | 1.1 |
| 72 ATK/CVE | 298-473 | 8.1(+12) | 0 | 975±50 | 0.9 | 1.1 |
| 72 DAV/HUI | 232-500 | 3.3(+12) | - | 570±16 | 0.9 | 1.1 |
| 72 STU/NIK3 | 298 | 3.8(+11) | - | - | 0.9 | 1.1 |
| 74 ATK/PIT1 | 300-392 | 3.4(+12) | 0 | 640±100 | | |
| 74 ATK/PIT2 | 301 | 4.0(+11) | - | - | 0.9 | 1.1 |
| 74 MCC $k/k_{ref}$: 0.042 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O + (CH_3)_2C{=}CH_2 \rightarrow$ products | | | | | | |
| 74 SLA/PRU | 300 | 4.6(+12) | - | - | | |
| 77 ATK/PIT1 | 298-439 | 5.6(+12) | 0 | 742±100 | | |
| ---------- | | | | | | |
| $O + CD_2{=}CD_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + ETHENE-$d_4$- | | | | | | |
| 72 STU/NIK3 REACTION ORDER: 2 | 298 | 3.4(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| O + $CH_2{=}CH_2$ + M → products | | | | | | |
| OXYGEN ATOM + ETHENE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 7.0(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k GIVEN WITH CAUTION | | | | | | |
| O + $CH_3CH_3$ → OH + $CH_3CH_2$. | | | | | | |
| OXYGEN ATOM + ETHANE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 313-523 | 2.3(+13) | 0 | 3780±350 | 0.5 | 1.5 |
| 71 PAP/ASH | 300-365 | 2.8(+13) | 0 | 3270±125 | 0.7 | 1.5 |
| $O^*(^1D)$ + $CH_3CH_3$ → OH + $CH_3CH_2$. | | | | | | |
| OXYGEN ATOM + ETHANE | | | | | | |
| 76 FLE/HUS REACTION ORDER: 2 | 300 | 4.4(+14) | - | - | 0.9 | 1.1 |
| O + $CH_3CH_3$ → HCHO + $H_2$ + $CH_2$ | | | | | | |
| OXYGEN ATOM + ETHANE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 313-523 | 1.2(+12) | 0 | 2160±350 | 0.5 | 1.5 |
| O + $CH_3CH_3$ → products | | | | | | |
| OXYGEN ATOM + ETHANE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 2.7(+12) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $O^*(^1D)$ + $CH_3CH_3$ → products | | | | | | |
| OXYGEN ATOM + ETHANE | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.512 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D)$ + $(CH_3)_4C$ → products | | | | | | |
| O + $CH_3CH_3$ + M → products | | | | | | |
| OXYGEN ATOM + ETHANE | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 2.9(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k GIVEN WITH CAUTION | | | | | | |
| O + .CH=C=C → CO + CO + H | | | | | | |
| OXYGEN ATOM + ETHENYL, 2-OXO-, FREE RADICAL | | | | | | |
| 73 JCN/BAY1 REACTION ORDER 2 | 298 | 1.2(+12) | - | - | 0.7 | 1.3 |
| O + .CH=C=C → products | | | | | | |
| OXYGEN ATOM + ETHENYL, 2-OXO-, FREE RADICAL | | | | | | |
| 73 JCN/BAY2 REACTION ORDER: 2 | 296 | 2.2(+10) | - | - | 0.5 | 1.5 |
| O + $CH_2{=}C{=}C$ → .CHO + .CHO | | | | | | |
| OXYGEN ATOM + ETHENONE | | | | | | |
| 74 MAC/THR2 REACTION ORDER: 2 | 293 | 3.4(+11) | - | - | 0.9 | 1.1 |
| O + $CH_2{=}C{=}C$ → products | | | | | | |
| OXYGEN ATOM + ETHENONE | | | | | | |
| 73 JCN/BAY2 REACTION ORDER: 2 | 296 | 1.7(+11) | - | - | 0.8 | 1.2 |
| 75 GAE/ATK1 | 296 | 2.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| O + $CH_3CHO$ → OH + $CH_3C(O)$. | | | | | | |
| OXYGEN ATOM + ACETALDEHYDE | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 373-428 | 1.6(+10) | 0 | 600 | | |
| 74 MAC/THR1 | 300 | 2.9(+11) | - | - | 0.9 | 1.1 |
| 77 SIN/IRW | 298-472 | 7.2(+12) | 0 | 986±77 | 0.8 | 1.2 |
| O + $CH_3CHO$ → OH + .$CH_2CHO$ | | | | | | |
| OXYGEN ATOM + ACETALDEHYDE | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 373-428 | 4.3(+12) | 0 | 2920 | | |
| O + $CH_3CHO$ → HCHO + $CH_2$ + CO + $CO_2$ + $H_2$ | | | | | | |
| OXYGEN ATOM + ACETALDEHYDE | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 373-428 | 8.8(+10) | 0 | 1160 | | |
| O + $CH_3CH_2OH$ → OH + .$CH_2CH_2OH$ + $CH_3CH_2O$. | | | | | | |
| OXYGEN ATOM + ETHANOL | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 1.9(+13) | 0 | 2945 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| O + $CH_3CH_2OH$ → $H_2O$ + HCHO + $CH_2$ | | | | | | |
| OXYGEN ATOM + ETHANOL | | | | | | |
| 71 AVE/KOL2 REACTION ORDER: 2 | 343-523 | 3.4(+11) | 0 | 1335 | | |
| O + $CH_3CH_2OH$ → $H_2O$ + $CH_3CHO$ | | | | | | |
| OXYGEN ATOM + ETHANOL | | | | | | |
| 71 AVE/KOL2 REACTION ORDER: 2 | 343-413 | 7.5(+11) | 0 | 1465 | | |
| O + $(CH_3)_2O$ → OH + $.CH_2OCH_3$ | | | | | | |
| OXYGEN ATOM + METHANE, OXYBIS- | | | | | | |
| 72 LEE/MEA REACTION ORDER: 2 | 217-366 | 5.0(+12) | 0 | 1435±100 | 0.8 | 1.2 |
| O + cy-$CH_2CH_2S$ → SO + $CH_2$=$CH_2$ | | | | | | |
| OXYGEN ATOM + THIIRANE | | | | | | |
| 76 LEE/TIM REACTION ORDER: 2 | 268-424 | 8.1(+12) | 0 | 18±20 | 0.9 | 1.1 |
| O + $CH_3CH_2SH$ → H + $CH_3CH_2S(O)$. + HS(O). + $CH_3CH_2$. | | | | | | |
| OXYGEN ATOM + ETHANETHIOL | | | | | | |
| 76 SLA/GRA REACTION ORDER: 2 | 300 | 1.7(+12) | - | - | | |
| O + $(CH_3)_2S$ → $CH_3$ + $CH_3S(O)$. | | | | | | |
| OXYGEN ATOM + METHANE, THIOBIS- | | | | | | |
| 76 LEE/TIM REACTION ORDER: 2 | 268-424 | 8.6(+12) | 0 | -366±16 | 0.9 | 1.1 |
| 76 SLA/GRA | 300 | 3.8(+13) | - | - | | |
| O + $(CH_3)_2S$ → products | | | | | | |
| OXYGEN ATOM + METHANE, THIOBIS- | | | | | | |
| 74 CAD/WIC REACTION ORDER: 2 | 300 | 3.3(+11) | - | - | | |
| O + $CH_3CN$ → $CH_3$ + OCN | | | | | | |
| OXYGEN ATOM + ACETONITRILE | | | | | | |
| 77 BON/TIM REACTION ORDER: 2 | 383-500 | 4.8(+11) | 0 | 2400±100 | 0.8 | 1.2 |
| $k/k_{ref}$: 1.2 | 383 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: O + $CD_3CN$ → $CD_3$ + OCN | | | | | | |
| $k/k_{ref}$: 1.5 | 423 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: O + $CD_3CN$ → $CD_3$ + OCN | | | | | | |
| O + $CH_3CH_2ONO$ → OH + $CH_3CHO$ + NO | | | | | | |
| OXYGEN ATOM + NITROUS ACID ETHYL ESTER | | | | | | |
| 75 DAV/THR REACTION ORDER: 2 | 300-410 | 2.6(+13) | 0 | 2440±240 | | |
| O + OC=C=CO → CO + CO + CO | | | | | | |
| OXYGEN ATOM + 1,2-PROPADIENE-1,3-DIONE | | | | | | |
| 74 PIL/WAG REACTION ORDER: 2 | 250-450 | 1.0(+13) | 0 | 1100±170 | 0.8 | 1.2 |
| $O^*(^1D)$ + OC=C=CO → CO + CO + CO | | | | | | |
| OXYGEN ATOM + 1,2-PROPADIENE-1,3-DIONE | | | | | | |
| 73 BEI/BUS$_2$ REACTION ORDER: 2 | 300 | 2.4(+14) | - | - | 0.9 | 1.1 |
| O + $CH_3C$≡CH → cy-:$(CH_3)$C=CH:O | | | | | | |
| OXYGEN ATOM + PROPYNE | | | | | | |
| 73 BER REACTION ORDER: 2 | 275-360 | 1.6(+13) | 0 | 1010 | | |
| O + $CH_3C$≡CH → products | | | | | | |
| OXYGEN ATOM + PROPYNE | | | | | | |
| 75 AFR/COX REACTION ORDER: 2 | 298-600 | 1.4(+13) | 0 | 980±350 | 0.7 | 1.3 |
| O + $CH_2$=C=$CH_2$ → CO + $CH_2$=$CH_2$ | | | | | | |
| OXYGEN ATOM + 1,2-PROPADIENE | | | | | | |
| 72 BER/WAG REACTION ORDER: 2 | 275-375 | 7.8(+12) | 0 | 805 | 0.7 | 1.3 |
| O + $CH_2$=C=$CH_2$ → cy-$(CH_2$=C$)CH_2O^*$ | | | | | | |
| OXYGEN ATOM + 1,2-PROPADIENE | | | | | | |
| 73 BER REACTION ORDER: 2 | 275-360 | 7.8(+12) | 0 | 806 | | |
| O + $CH_2$=C=$CH_2$ → products | | | | | | |
| OXYGEN ATOM + 1,2-PROPADIENE | | | | | | |
| 74 BAV REACTION ORDER: 2 $k/k_{ref}$: 0.66 | 298 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: O + $CH_3CH_2CH{=}CH_2$ → products | | | | | | |
| $k/k_{ref}$: 0.197 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| 77 ATK/PIT2 REACTION ORDER: 2 | 297-439 | 1.2(+13) | 0 | 883±100 | 0.9 | 1.1 |
| O + $CH_3CH{=}CH_2$ → OH + $.CH_2CH{=}CH_2$ | | | | | | |
| OXYGEN ATOM + PROPENE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 373-583 | 7.2(+12) | 0 | 2720 | | |
| O + $CH_3CH{=}CH_2$ → HCHO + $H_2$ + $CH_2{=}C{:}$ | | | | | | |
| OXYGEN ATOM + PROPENE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 361-483 | 5.4(+11) | 0 | 1260 | | |
| O + $CH_3CH{=}CH_2$ → $CH_3CHO$ + $CH_2$ | | | | | | |
| OXYGEN ATOM + PROPENE | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 361-483 | 5.1(+10) | 0 | 750 | | |
| O + $CH_3CH{=}CH_2$ → cy-$(CH_3)CHCH_2O$ | | | | | | |
| OXYGEN ATOM + PROPENE | | | | | | |
| 72 KUR1 REACTION ORDER: 2 | 201-424 | 2.5(+12) | 0 | 38±22 | 0.9 | 1.1 |
| 73 HER | 275-360 | 4.2(+12) | 0 | 253 | | |
| 74 FUR/ATK | 298 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 7.6(+12) | 0 | 363±20 | 0.9 | 1.1 |
| O + $CH_3CH{=}CH_2$ → products | | | | | | |
| OXYGEN ATOM + PROPENE | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 71 STU/NIK2 | 300 | 2.2(+11) | - | - | 0.9 | 1.1 |
| 72 ATK/CVE | 298-473 | 6.7(+12) | 0 | 520±50 | 0.9 | 1.1 |
| 74 ATK/PIT1 | 300-392 | 2.1(+12) | 0 | 0±150 | | |
| 74 ATK/PIT2 | 300 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 74 MCC $k/k_{ref}$: 0.2 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| O + $CH_3CH{=}CH_2$ → products | | | | | | |
| 77 ATK/PIT1 | 298-439 | 6.3(+12) | 0 | 260±100 | | |
| O + cy-$CH_2CH_2CH_2$ → OH + cy-$CH_2CH_2CH.$ | | | | | | |
| OXYGEN ATOM + CYCLOPROPANE | | | | | | |
| 76 LEE REACTION ORDER: 2 | 298-478 | 3.3(+12) | 0 | -3120±60 | 0.9 | 1.1 |
| O + $CH_3CH_2CH_3$ → OH + $(CH_3)_2CH.$ + $CH_3CH_2CH_2.$ | | | | | | |
| OXYGEN ATOM + PROPANE | | | | | | |
| 75 BAR/BUR REACTION ORDER: 2 | 329 | 3.9(+10) | - | - | 0.8 | 1.2 |
| $O^*(^1D)$ + $CH_3CH_2CH_3$ → OH + $(CH_3)_2CH.$ + $CH_3CH_2CH_2.$ | | | | | | |
| OXYGEN ATOM + PROPANE | | | | | | |
| 76 FLE/HUS REACTION ORDER: 2 | 300 | 5.7(+14) | - | - | 0.9 | 1.1 |
| $O^*(^1D)$ + $CH_3CH_2CH_3$ → products | | | | | | |
| OXYGEN ATOM + PROPANE | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.652 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D)$ + $(CH_3)_4C$ → products | | | | | | |
| 75 GAU/SNE | 300 | 4.8(+14) | - | - | | |
| NOTE: EVALUATION $k/k_{ref}$:10.8 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $O^*(^1D)$ + $O_2$ → O + $O_2^*(^1\Sigma_u^+)$ | | | | | | |
| O + $CH_2{=}CHCHO$ → products | | | | | | |
| OXYGEN ATOM + 2-PROPENAL | | | | | | |
| 72 CAD/LIN REACTION ORDER: 2 | 300-480 | 4.7(+12) | 0 | 1000±150 | 0.7 | 1.3 |
| 75 GAF/ATK1 | 296 | 2.3(+11) | - | - | 0.9 | 1.1 |
| 75 GAF/ATK2 | 296-423 | 1.4(+13) | 0 | 1210±135 | 0.9 | 1.1 |
| O + $CH_2{=}CHOCH_3$ → products | | | | | | |
| OXYGEN ATOM + ETHENE, METHOXY- | | | | | | |
| 77 ATK/PIT2 REACTION ORDER: 2 | 297-439 | 3.8(+12) | 0 | -38±100 | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| O + $CH_3CH_2CHO$ → OH + $CH_3CH_2C(O)$. | | | | | | |
| OXYGEN ATOM + PROPANAL | | | | | | |
| 77 SIN/IRW REACTION ORDER: 2 | 298-472 | 7.8(12) | 0 | 870±33 | 0.9 | 1.1 |
| O + $CH_3CH_2CHO$ → products | | | | | | |
| OXYGEN ATOM + PROPANAL | | | | | | |
| 72 CAD/LIN REACTION ORDER: 2 | 300-480 | 8.5(+13) | 0 | 1910±250 | 0.7 | 1.3 |
| O + $(CH_3)_2CO$ → OH + $.CH_2COCH_3$ | | | | | | |
| OXYGEN ATOM + 2-PROPANONE | | | | | | |
| 72 AZA/GYU REACTION ORDER: 2 | 873 | 8.4(+10) | - | - | | |
| 77 LEE/TIM | 298-478 | 1.9(+12) | 0 | 2540±90 | 0.8 | 1.2 |
| O + CH≡CC≡CH → products | | | | | | |
| OXYGEN ATOM + 1,3-BUTADIYNE | | | | | | |
| 73 JON/BAY2 REACTION ORDER: 2 | 296 | 1.6(+12) | - | - | 0.7 | 1.3 |
| 75 HOM/SCH | 297-343 | 8.0(+13) | 0 | 1230 | | |
| O + $CH_2$=CHC≡CH → products | | | | | | |
| OXYGEN ATOM + 1-BUTEN-3-YNE | | | | | | |
| 75 HOM/SCH REACTION ORDER: 2 | 295 | 3.0(+12) | - | - | 0.9 | 1.1 |
| O + $CH_3CH_2C$≡CH → CO + $CH_3CH_2CH$: | | | | | | |
| OXYGEN ATOM + 1-BUTYNE | | | | | | |
| 75 HER/WAG1 REACTION ORDER: 2 | 290-357 | 1.7(+13) | 0 | 400 | | |
| O + $CH_3C$≡$CCH_3$ → CO + $(CH_3)_2C$: | | | | | | |
| OXYGEN ATOM + 2-BUTYNE | | | | | | |
| 75 HER/WAG2 REACTION ORDER: 2 | 290-360 | 6.0(+13) | 0 | 453 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| O + $CH_3CH$=C=$CH_2$ → products | | | | | | |
| OXYGEN ATOM + 1,2-BUTADIENE | | | | | | |
| 74 HAV REACTION ORDER: 2 $k/k_{ref}$: 1.39 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: O + $CH_3CH_2CH$=CH → products | | | | | | |
| $k/k_{ref}$: 0.43 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: O + $(CH_3)_2C$=$CH_2$ → products | | | | | | |
| O + $CH_2$=CHCH=$CH_2$ → products | | | | | | |
| OXYGEN ATOM + 1,3-BUTADIENE | | | | | | |
| 74 MCC REACTION ORDER: 2 $k/k_{ref}$: 0.96 | 298 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: O + $(CH_3)_2C$=$CH_2$ → products | | | | | | |
| 77 ATK/PIT2 | 297-439 | 2.0(+13) | 0 | 53±100 | 0.9 | 1.1 |
| O + $CH_3CH_2CH$=$CH_2$ → OH + [$C_4H_7$.] | | | | | | |
| OXYGEN ATOM + 1-BUTENE | | | | | | |
| 72 HUI/HER2 REACTION ORDER: 2 | 190-491 | 9.6(+12) | 0 | 990±215 | 0.4 | 1.6 |
| O + $CH_3CH_2CH$=$CH_2$ → cy-$(CH_3CH_2)CHCH_2O$ | | | | | | |
| OXYGEN ATOM + 1-BUTENE | | | | | | |
| 72 HUI/HER2 REACTION ORDER: 2 | 190-491 | 2.2(+12) | 0 | 25±105 | 0.5 | 1.5 |
| 74 FUR/ATK | 298 | 2.4(+12) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 7.2(+12) | 0 | 332±23 | 0.9 | 1.1 |
| O + $CH_3CH_2CH$=$CH_2$ → products | | | | | | |
| OXYGEN ATOM + 1-BUTENE | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 1.6(+12) | - | - | 0.9 | 1.1 |
| 71 HUI/HER | 259-493 | 8.8(+12) | 0 | 382±30 | 0.9 | 1.1 |
| OXYGEN ATOM + 1-BUTENE | | | | | | |
| 72 ATK/CVE | 298-473 | 6.1(+12) | 0 | 410±50 | 0.9 | 1.1 |
| 74 HAV | 298 | - | - | - | | |
| NOTE: $k_{ref}$: O + $(CH_3)_2C$=$CH_2$ → products | | | | | | |
| 74 MCC $k/k_{ref}$: 0.23 | 298 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: O + $(CH_3)_2C$=$CH_2$ → products | | | | | | |
| 77 ATK/PIT1 $k/k_{ref}$: 0.18 | 298-439 | 8.4(+12) | 0 | -335±100 | | |
| O + cis-$CH_3CH$=$CHCH_3$ → cy-$(CH_3)CHCH(CH_3)O$ | | | | | | |
| OXYGEN ATOM + cis-2-BUTENE | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 9.0(+12) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 SIN/CVE | 298-480 | 6.7(+12) | 0 | -135±13 | 0.9 | 1.1 |
| 73 DAV/HUI | 268-443 | 5.8(+12) | 0 | -161±32 | 0.9 | 1.1 |
| ---------- | | | | | | |
| O + cis-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| OXYGEN ATOM + cis-2-BUTENE | | | | | | |
| 74 HAU REACTION ORDER: 2 $k/k_{ref}$: 0.95 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| 74 MCC $k/k_{ref}$: 0.79 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ | | | | | | |
| 77 ATK/PIT1 | 298-439 | 7.3(+12) | 0 | -118±100 | | |
| ---------- | | | | | | |
| O + trans-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| OXYGEN ATOM + trans-2-BUTENE | | | | | | |
| 74 MCC REACTION ORDER: 2 $k/k_{ref}$: 1.25 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| 77 ATK/PIT1 | 298-439 | 1.4(+13) | 0 | -10±100 | | |
| ---------- | | | | | | |
| O + $(CH_3)_2C{=}CH_2$ → cy-$(CH_3)_2CCH_2O$ | | | | | | |
| OXYGEN ATOM + 1-PROPENE, 2-METHYL- | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 9.9(+12) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 8.7(+12) | 0 | -51±22 | 0.9 | 1.1 |
| ---------- | | | | | | |
| O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| OXYGEN ATOM + 1-PROPENE, 2-METHYL- | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 6.2(+12) | - | - | 0.8 | 1.2 |
| 72 ATK/CVE | 298-473 | 6.3(+12) | 0 | 0±200 | 0.8 | 1.2 |
| 77 ATK/PIT1 | 298-439 | 1.1(+13) | 0 | 43±100 | | |
| ---------- | | | | | | |
| O + $(CH_3)_2C{=}CHD$ → products | | | | | | |
| OXYGEN ATOM + PROPENE-1-D1, 2-METHYL | | | | | | |
| 76 HAV/HUN REACTION ORDER: 2 $k/k_{ref}$: 1.03 | 298-302 | - | - | - | | |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| ---------- | | | | | | |
| O + $(CH_3)_2C{=}CD_2$ → products | | | | | | |
| OXYGEN ATOM + PROPENE-1,1-$d_2$, 2-METHYL | | | | | | |
| 76 HAV/HUN REACTION ORDER: 2 $k/k_{ref}$: 1.05 | 298-302 | - | - | - | | |
| NOTE: $k_{ref}$: O + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| ---------- | | | | | | |
| O + $CH_3CH_2CH_2CH_3$ → OH + $CH_3CH_2CH_2CH_2\cdot$ + $CH_3CH_2CH(\cdot)CH_3$ | | | | | | |
| OXYGEN ATOM + BUTANE | | | | | | |
| 71 PAP/ASH REACTION ORDER: 2 | 300-365 | 1.7(+13) | 0 | 2280±120 | 0.7 | 1.4 |
| 77 ATK/PER1 | 298-439 | 1.5(+13) | 0 | 2100±150 | 0.8 | 1.2 |
| ---------- | | | | | | |
| O + $CH_3CH_2CH_2CH_3$ → products | | | | | | |
| OXYGEN ATOM + BUTANE | | | | | | |
| 74 ATK/PIT2 REACTION ORDER: 2 | 301 | 1.9(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O^*(^1D)$ + $CH_3CH_2CH_2CH_3$ → products | | | | | | |
| OXYGEN ATOM + BUTENE | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.863 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D)$ + $(CH_3)_4C$ → products | | | | | | |
| ---------- | | | | | | |
| $O^*(^1D)$ + $(CH_3)_4C$ → products | | | | | | |
| OXYGEN ATOM + PROPANE, 2, 2-DIMETHYL- | | | | | | |
| 75 GAU/SNE REACTION ORDER: 2 $k/k_{ref}$: 14.0 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D)$ + $O_2$ → O + $O_2^*(^1\Sigma_g^+)$ | | | | | | |
| 75 GAU/SNE | 300 | 6.3(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| O + $CH_3CH{=}CHCHO$ → products | | | | | | |
| OXYGEN ATOM + 2-BUTENAL | | | | | | |
| 74 CAD/WIC REACTION ORDER: 2 | | 2.0(+13) | 0 | 1160 | | |
| NOTE: UNSPECIFIED TEMPERATURE RANGE IN THE VICINITY OF 300K | | | | | | |
| 75 GAF/ATK$_1$ | 296 | 5.1(+11) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 GAF/ATK2 | 296-423 | 1.5(+13) | 0 | 995±65 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + CH_3CH_2CH_2CHO \rightarrow OH + CH_3CH_2CH_2C(O).$ | | | | | | |
| OXYGEN ATOM + BUTANAL | | | | | | |
| 74 JAF/WAN REACTION ORDER: 2 | 298 | 1.5(+11) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 77 SIN/IRW | 298-472 | 1.0(+13) | 0 | 857±20 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + (CH_3)_2CHCHO \rightarrow OH + (CH_3)_2CHC(O).$ | | | | | | |
| OXYGEN ATOM + PROPANAL, 2-METHYL- | | | | | | |
| 77 SIN/IRW REACTION ORDER: 2 | 298-472 | 7.9(+12) | 0 | 727±45 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + (CH_3)_2C{=}C{=}CH_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + 1,2-BUTADIENE,3-METHYL- | | | | | | |
| 74 HAU REACTION ORDER: 2 $k/k_{ref}$: 0.76 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O + (CH_3)_2C{=}CHCH_3 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + (CH_3)_2CCH{=}CH_2 \rightarrow cy\text{-}[(CH_3)_2C]CHCH_2O$ | | | | | | |
| OXYGEN ATOM + 1-BUTENE, 3-METHYL- | | | | | | |
| 76 SIN/CVE REACTION ORDER: 2 | 298-480 | 6.0(+12) | 0 | 266±26 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + (CH_3)_2CHCH{=}CH_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + 1-BUTENE, 3-METHYL- | | | | | | |
| 74 MCC REACTION ORDER: 2 $k/k_{ref}$: 0.22 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O + (CH_3)_2C{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O + CH_3CH{=}C(CH_3)_2 \rightarrow cy\text{-}(CH_3)CHC(CH_3)_2O$ | | | | | | |
| OXYGEN ATOM + 2-BUTENE, 2-METHYL- | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 3.1(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O^*(^1D) + CH_3CH_2CH_2CH_2CH_3 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + PENTANE | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.988 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $O^*(^1D) + (CH_3)_4C \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O^*(^1D) + (CH_3)_4C \rightarrow OH + (CH_3)_3CCH_2.$ | | | | | | |
| OXYGEN ATOM + PROPANE, 2, 2-DIMETHYL- | | | | | | |
| 71 SCO/CVE REACTION ORDER: 2 $k/k_{ref}$: 4.29 | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + N_2O \rightarrow N_2 + O_2 + NO + NO$ | | | | | | |
| 76 FLE/HUS | 300 | 7.4(+14) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O + (CH_3)_2C{=}C(CH_3)_2 \rightarrow cy[(CH_3)_2CHCH(CH_3)_2]O$ | | | | | | |
| OXYGEN ATOM + 2-BUTENE, 2, 3-DIMETHYL- | | | | | | |
| 73 DAV/HUI REACTION ORDER: 2 | 298-355 | 3.4(+12) | 0 | -790±60 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $O + (CH_3)_2C{=}C(CH_3)_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 75 SIN/FUR REACTION ORDER: 2 | 298-481 | 1.2(+13) | 0 | -390±38 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O^*(^1D) + (CH_3)_3CCH_2CH(CH_3)_2 \rightarrow$ products | | | | | | |
| OXYGEN ATOM + 2,2,4-TRIMETHYL PENTANE | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 1.26 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O^*(^1D) + (CH_3)_4C \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O_2 + O^*(^1D) \rightarrow$ products | | | | | | |
| OXYGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 73 HEI/HUS1 REACTION ORDER: 2 | 300 | 4.2(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_2 + O + M \rightarrow O_3 + M$ | | | | | | |
| OXYGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 71 STU/NIKI REACTION ORDER: 3 M: CO | 300 | 2.4(+14) | - | - | 0.7 | 1.3 |
| 71 ELL/CAS $k/k_{ref}$: 0.006 | 298 | - | - | - | | |
| NOTE: $O_3 + O \rightarrow O_2 + O_2$; M=He,Xe,$N_2$ (AT 2537Å) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 HIP/TRØ REACTION ØRDER: 2 M: $N_2$ | 298 | 1.0(+12) | - | - | 0.8 | 1.2 |
| NØTE: LIMITING HIGH PRESSURE k | | | | | | |
| 71 HIP/TRØ REACTION ØRDER: 3 M: $N_2$ | 298 | 2.9(+14) | - | - | 0.8 | 1.2 |
| NØTE: $k_0$ (LØW PRESSURE) | | | | | | |
| 71 STU/NIK1 M: $Ø_2$ | 300 | 2.3(+14) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 300 | 2.0(+14) | - | - | 0.7 | 1.3 |
| 72 CAS/SCH $k/k_{ref}$: 0.027 | 261 | - | - | - | | |
| NØTE: $k_{ref}$: $Ø_3 + Ø \rightarrow Ø_2 + Ø_2$; M=$Ø_2$,$Ø_3$,$N_2$ (AT 3340Å) | | | | | | |
| $k/k_{ref}$: 0.006 | 298 | - | - | - | | |
| NØTE: $k_{ref}$: $Ø_3 + Ø \rightarrow Ø_2 + Ø_2$; M=$Ø_2$,$Ø_3$,$N_2$ (AT 3340Å) | | | | | | |
| 72 TCH | 298 | 4.4(+14) | - | - | | |
| NØTE: RØØM TEMPERATURE, ASSUMED TØ BE 298K | | | | | | |
| 72 HUI/HER1 M: Ar | 200-346 | 2.4(+13) | 0 | -510±23 | 0.9 | 1.1 |
| M: Ar | 218 | 2.5(+14) | - | - | | |
| NØTE:M eff: Ar(1.0) | | | | | | |
| M: $N_2$ | 218 | 4.0(+14) | - | - | | |
| NØTE:M eff: $N_2$(1.6) | | | | | | |
| M: Ar | 298 | 1.3(+14) | - | - | | |
| NØTE:M eff: Ar(1.0) | | | | | | |
| M: He | 298 | 1.2(+14) | - | - | 0.9 | 1.1 |
| NØTE:M eff: He(0.92) | | | | | | |
| M: $N_2$ | 298 | 2.1(+14) | - | - | 0.9 | 1.1 |
| NØTE:M eff: $N_2$(1.6) | | | | | | |
| 73 PAL/LAR M: $Ø_2$ | 295 | 2.2(+14) | - | - | 0.8 | 1.2 |
| M: Ar | 295 | 1.5(+14) | - | - | 0.6 | 1.4 |
| M: $N_2$ | 295 | 2.0(+14) | - | - | 0.8 | 1.2 |
| 73 STE/NIK1 | 298 | - | - | - | 0.9 | 1.1 |
| NØTE: $k[M]/k_{ref}$: $1.08 \times 10^{-3}$. $k_{ref}$: $NØ_2 + Ø \rightarrow NØ + Ø_2$ | | | | | | |
| 73 CAS/SCH $k/k_{ref}$: 0.006 | 298 | - | - | - | | |
| NØTE: $k_{ref}$: $Ø_3 + Ø \rightarrow Ø_2 + Ø_2$; M=$Ø_2$,$N_2$ (AT 3340Å) | | | | | | |
| 73 GAE/GLA REACTION ØRDER: 2 M: $N_2$ | 300 | 6.0(+11) | - | - | | |
| NØTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 74 SNE REACTION ØRDER: 3 | 295 | 1.8(+14) | - | - | 0.9 | 1.1 |
| 75 GAE/TRØ M: $N_2$ | 296 | 1.7(+12) | - | - | 0.6 | 1.4 |
| NØTE: LIMITING HIGH-PRESSURE k (REEVALUATIØN) | | | | | | |
| 75 HIP/SCH M: $N_2$ | 295 | 1.7(+12) | - | - | 0.6 | 1.4 |
| NØTE: LIMITING HIGH-PRESSURE k (REEVALUATIØN | | | | | | |
| 75 HIP/SCH REACTION ØRDER: 3 M: $N_2$ | 295 | 2.3(+14) | - | - | 0.6 | 1.4 |
| NØTE: LIMITING LØW-PRESSURE k (REEVALUATIØN) | | | | | | |
| 76 BØG/BUR M: $Ø_2$ | 300 | 2.3(+14) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $Ø_2 + Ø + M \rightarrow Ø_3 + M^*$ | | | | | | |
| ØXYGEN MØLECULE + ØXYGEN ATØM | | | | | | |
| 71 FIN/SNE REACTION ØRDER: 3 | 283-321 | 3.2(+11) | 0 | 1680 | | |
| NØTE: $M^* = Ø_2^*(^1\Delta_g)$ | | | | | | |
| --- | | | | | | |
| $Ø_2 + Ø + M \rightarrow Ø_3^\ddagger + M$ | | | | | | |
| ØXYGEN MØLECULE + ØXYGEN ATØM | | | | | | |
| 73 BEV/JØH REACTION ØRDER: 3 M: $Ø_2$ | 295 | 2.0(+14) | - | - | 0.9 | 1.1 |
| 73 BEV/JØH M: Ar | 295 | 9.8(+13) | - | - | 0.9 | 1.1 |
| REACTION ØRDER: 3 M: $SF_6$ | 295 | 1.1(+15) | - | - | 0.9 | 1.1 |
| | 295 | 4.7(+14) | - | - | 0.9 | 1.1 |
| | 295 | 4.8(+14) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $Ø_2 + Ø + M \rightarrow Ø_3^\ddagger(v1,v3) + M$ | | | | | | |
| ØXYGEN MØLECULE + ØXYGEN ATØM | | | | | | |
| 73 RØS/TRA REACTION ØRDER: 3 | 300 | - | - | - | | |
| NØTE: $k_{ref}$: $Ø_3^\ddagger(v1,v3) + M \rightarrow Ø_3 + M$; $k/k_{ref}$: $1.5 \times 10^{-20}$ $cm^{-3}$ | | | | | | |
| --- | | | | | | |
| $Ø_2 + Ø + M \rightarrow Ø_3^\ddagger(v=n) + M$ | | | | | | |
| ØXYGEN MØLECULE + ØXYGEN ATØM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 RES/TRA — REACTION ORDER: 3 | 300 | 1.1(+4) | - | - | 0.8 | 1.2 |
| NOTE: M=$O_2$, OR $N_2$ | | | | | | |
| --- | | | | | | |
| $O_2$ + H → O + OH | | | | | | |
| OXYGEN MOLECULE + HYDROGEN ATOM — REACTION ORDER: 2 | | | | | | |
| 71 BRA/BEL1 | 1150-1400 | 1.3(+14) | 0 | 8205±550 | 0.8 | 1.2 |
| 71 BRA/BEL2 | 30-90 | 1.4(+14) | 0 | 8255 | 0.9 | 1.1 |
| NOTE: RANKINE-HUGONIOT MEASUREMENTS IN SHOCK TUBE AT LOW T | | | | | | |
| 71 BEL/BRA | 1128-1152 | 1.8(+14) | 0 | 8050 | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $O_2$ + H → O + OH | | | | | | |
| OXYGEN MOLECULE + HYDROGEN ATOM — REACTION ORDER: 2 | | | | | | |
| 71 FBE/HOY | 650-1000 | 2.3(+14) | 0 | 8455 | | |
| 73 KEC/MOI | 913-1473 | 2.7(+14) | 0 | 8355±235 | 0.8 | 1.2 |
| 73 SCH | 1250-2500 | 1.2(+17) | -0.9 | 8369 | | |
| 74 NAM/TRO | 839-924 | 4.8(+9) | - | - | | |
| NOTE: E NOT DETERMINED. WITHIN THE GIVEN T RANGE TOTAL K INCREASES FROM $4.8\times10^9$ TO $9.6\times10^9 cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 75 EEW | 1900-2400 | 6.0(+14) | - | 8450 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| --- | | | | | | |
| $O_2$ + D → O + OD | | | | | | |
| OXYGEN MOLECULE + DEUTERIUM ATOM — REACTION ORDER: 2 | | | | | | |
| 75 AFP/APP | 1700-3100 | 3.1(+14) | 0 | 9935 | 0.7 | 1.3 |
| --- | | | | | | |
| $O_2^*(^1\Delta_g)$ + H → O + OH | | | | | | |
| OXYGEN MOLECULE + HYDROGEN ATOM — REACTION ORDER: 2 | | | | | | |
| 72 SCH/$SCH_2$ | 300 | 1.5(+10) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $O_2$ + H + M → $HO_2$ + M | | | | | | |
| OXYGEN MOLECULE + HYDROGEN ATOM — REACTION ORDER: 3 — M: Ar | 1750 | 1.2(+15) | - | - | 0.7 | 1.3 |
| 71 GAY/PRA | | | | | | |
| NOTE: MEAN T. M eff: Ar(1.0) — M: $H_2O$ | 1750 | 2.2(+16) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: $H_2O$( 18.0) — M: $N_2$ | 1600 | 2.0(+15) | - | - | 0.8 | 1.2 |
| NOTE: MEAN T. M eff: $N_2$(2.0) — M: Ar | 298 | 5.9(+15) | - | - | 0.9 | 1.1 |
| 71 HIK/EYR — M: $H_2$ | 298 | 4.7(+15) | - | - | | |
| 71 OSB — M: He | 298 | 2.7(+15) | - | - | | |
| M: Ne | 298 | 5.8(+14) | - | - | | |
| M: Ar | 298 | 2.1(+15) | - | - | | |
| M: Kr | 298 | 3.9(+15) | - | - | | |
| M: $H_2$ | 298 | 4.4(+15) | - | - | 0.9 | 1.1 |
| 72 ABU/MIC | | | | | | |
| NOTE:M eff: $H_2$(2.0) — M: He | 298 | 2.7(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: He(1.2) — M: Ne | 298 | 5.4(+14) | - | - | 0.8 | 1.2 |
| NOTE:M eff: Ne(0.2) — M: Ar | 298 | 2.2(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: Ar(1.0) — M: Kr | 298 | 4.0(+15) | - | - | 0.9 | 1.1 |
| 72 ABU/MIC | | | | | | |
| NOTE:M eff: Kr(1.8) — M: Ar | 948-1125 | 2.3(+15) | 0 | 0 | | |
| 72 JAC/HOU — M: He | 293-404 | 2.4(+15) | 0 | -238±48 | 0.8 | 1.2 |
| 72 KUR2 — M: He | 226 | 7.0(+15) | - | - | | |
| NOTE:M eff: He(1.0) — M: He | 298 | 5.7(+15) | - | - | | |
| NOTE:M eff: He(1.0) — M: Ar | 298 | 5.7(+15) | - | - | | |
| NOTE:M eff: Ar(1.0) — M: $N_2$ | 226 | 3.2(+16) | - | - | | |
| NOTE:M eff: $N_2$(4.5) — M: $N_2$ | 298 | 1.9(+16) | - | - | | |
| NOTE:M eff: $N_2$(3.4) — M: $CH_4$ | 298 | 8.9(+16) | - | - | | |
| 72 KUR2 | | | | | | |
| NOTE:M eff: $CH_4$(15.7) | | | | | | |

| CHEMICAL REACTIONS | | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|---|
| 72 MCO/ALL | M: $H_2$ | 297 | 2.3(+16) | - | - | 0.8 | 1.2 |
| | M: He | 297 | 5.4(+15) | - | - | 0.9 | 1.1 |
| | M: Ar | 297 | 5.6(+15) | - | - | 0.9 | 1.1 |
| | | 298 | 6.8(+15) | - | - | 0.8 | 1.2 |
| NOTE: M=He,Ar (EVALUATION) | | | | | | | |
| 73 PEE/MAH1 | M: $O_2$ | 1900 | 2.5(+15) | - | - | | |
| 73 KOC/MOI | M: $H_2$ | 913-1473 | 3.2(+15) | 0 | -770±100 | 0.9 | 1.1 |
| 74 HAC/HOY | M: He | 300 | 5.0(+15) | - | - | 0.8 | 1.2 |
| 74 WEN/DAV | M: Ar | 220-360 | 2.4(+15) | 0 | -345±64 | 0.8 | 1.2 |
| | M: Ar | 220 | 1.2(+16) | - | - | | |
| NOTE:M eff: Ar(1.0) | | | | | | | |
| | M: $N_2$ | 220 | 3.1(+16) | - | - | 0.8 | 1.2 |
| NOTE:M eff: $N_2$(2.7) | | | | | | | |
| | M: He | 298 | 6.8(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: He(0.93) | | | | | | | |
| | M: Ar | 298 | 7.1(+15) | - | - | | |
| NOTE:M eff: Ar(1.0) | | | | | | | |
| | M: $H_2$ | 298 | 2.1(+16) | - | - | 0.8 | 1.2 |
| NOTE:M eff: $H_2$(3.0) | | | | | | | |
| | M: $N_2$ | 298 | 2.0(+16) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $N_2$(2.8) | | | | | | | |
| | M: $CH_4$ | 298 | 1.5(+17) | - | - | 0.6 | 1.4 |
| NOTE:M eff: $CH_4$(22.0) | | | | | | | |
| 75 VAS/MAK | M: He | 300 | 4.4(+15) | - | - | | |
| | M: Ar | 300 | 4.4(+15) | - | - | | |
| | M: $CO_2$ | 300 | 1.8(+16) | - | - | | |
| 76 HAC/WAG | M: He | 293 | 9.0(+15) | - | - | 0.9 | 1.1 |
| 77 SIA | M: Ar | 964-1075 | 2.2(+15) | 0 | 0 | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | | |
| | M: Ar | 200-2200 | 2.1(+18) | -1 | 0 | | |
| NOTE: ALTERNATIVE, T-DEPENDENT EXPRESSION (RECOMMENDED EVALUATION Meff (Ar): 1.0 | | | | | | | |
| | M: $N_2$ | 980-1176 | 3.3(+15) | 0 | 0 | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | | |
| | M: $N_2$ | 200-2000 | 6.7(+19) | -1.42 | 0 | | |
| NOTE: ALTERNATIVE T-DEPENDENT EXPRESSION (EVALUATION) Meff ($N_2$): 3.1 AT 300K DECREASING TO 1.5 ABOVE 1000K | | | | | | | |
| ---------- | | | | | | | |
| $O_2 + D + M \rightarrow DO_2 + M$ | | | | | | | |
| OXYGEN MOLECULE + DEUTERIUM ATOM | | | | | | | |
| 75 VAS/MAR REACTION ORDER: 3 | M: He | 300 | 4.4(+15) | - | - | | |
| | M: Ar | 300 | 4.4(+15) | - | - | | |
| | M: $CO_2$ | 300 | 1.7(+16) | - | - | | |
| ---------- | | | | | | | |
| $O_2 + H_2 \rightarrow OH + OH$ | | | | | | | |
| OXYGEN MOLECULE + HYDROGEN MOLECULE | | | | | | | |
| 71 BIL/ERA REACTION ORDER: 2 | | 1128-1152 | 1.7(+12) | 0 | 19630 | 0.7 | 1.2 |
| NOTE: EVALUATION | | | | | | | |
| 75 AZA/ALE | | 1076-1523 | 1.9(+14) | 0 | 21900±500 | 0.6 | 1.6 |
| $O_2 + D_2 \rightarrow OD + OD$ | | | | | | | |
| OXYGEN MOLECULE + DEUTERIUM MOLECULE | | | | | | | |
| 75 AZA/ALE REACTION ORDER: 2 | | 843 | 1.0(+3) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | | |
| $O_2 + S \rightarrow O + SO$ | | | | | | | |
| OXYGEN MOLECULE + SULFUR ATOM | | | | | | | |
| 72 DEN/LIT REACTION ORDER: 2 | | 295 | 1.0(+12) | - | - | 0.8 | 1.2 |
| 72 DAV/KLE1 | | 252-423 | 1.3(+12) | 0 | 0±50 | 0.9 | 1.1 |
| 75 CLY/TOW | | 298 | 9.0(+11) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | | |
| $O_2^*(^1\Delta_g) + SO_2 \rightarrow O + SO_3$ | | | | | | | |
| OXYGEN MOLECULE + SULFUR DIOXIDE | | | | | | | |
| 76 DUM REACTION ORDER: 2 | | 298 | 1.3(+8) | - | - | | |
| ---------- | | | | | | | |
| $O_2 + N^*(^2D) \rightarrow O + NO$ | | | | | | | |
| OXYGEN MOLECULE + NITROGEN ATOM | | | | | | | |
| 71 SLA/WOO REACTION ORDER: 2 | | 237-365 | 2.7(+11) | 0.5 | 0 | 0.8 | 1.2 |
| 72 HUS/KIR2 | | 300 | 5.6(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O_2 + N^*(^2D) \rightarrow$ products<br>OXYGEN MOLECULE + NITROGEN ATOM<br>71 LIN/KAU REACTION ORDER: 2 | 300 | 3.7(+12) | - | - | 0.7 | 1.3 |
| $O_2 + N^*(^2P) \rightarrow O + NO$<br>OXYGEN MOLECULE + NITROGEN ATOM<br>72 HUS/KIR2 REACTION ORDER: 2 | 300 | 2.8(+12) | - | - | 0.4 | 1.6 |
| $O_2^*(^1\Delta_g) + N \rightarrow O + NO$<br>OXYGEN MOLECULE + NITROGEN ATOM<br>73 SCH/SCH$_2$ REACTION ORDER: 2 | 300 | 1.3(+9) | - | - | 0.7 | 1.3 |
| $O_2^*(^1\Delta_g) + NO \rightarrow O + NO_2$<br>OXYGEN MOLECULE + NITROGEN OXIDE (NO)<br>76 DUM REACTION ORDER: 2 | 298 | 2.9(+6) | - | - | | |
| $O_2 + NO + NO \rightarrow NO_2 + NO_2$<br>OXYGEN MOLECULE + NITROGEN OXIDE (NO)<br>73 STF/NIK1 REACTION ORDER: 3<br>75 ENG/COR | 298<br>298-323 | 1.5(+10)<br>1.9(+9) | -<br>0 | -<br>602±25 | 0.9<br>0.9 | 1.1<br>1.1 |
| $O_2 + C(^3P) \rightarrow O + CO$<br>OXYGEN MOLECULE + CARBON ATOM<br>75 HUS/YOU REACTION ORDER: 2 | 300 | 1.6(+13) | - | - | 0.9 | 1.1 |
| $O_2 + CO \rightarrow O + CO_2$<br>OXYGEN MOLECULE + CARBON MONOXIDE<br>71 BRA/BEL1 REACTION ORDER: 2<br>76 WEI | 1300-1900<br>2500-2900 | 1.6(+13)<br>2.5(+13) | 0<br>0 | 20640<br>24160 | 0.6 | 1.7 |
| $O_2 + CH \rightarrow$ products<br>OXYGEN MOLECULE + METHYLIDYNE FREE RADICAL<br>71 BCS/PER REACTION ORDER: 2<br>NOTE: UPPER LIMIT k | 298 | <2.4(+13) | - | - | | |
| $O_2 + CH_2 \rightarrow H + H + CO_2$<br>OXYGEN MOLECULE + METHYLENE FREE RADICAL<br>73 PEF/MAH$_2$ REACTION ORDER: 2<br>NOTE: EVALUATION | 1200-1600 | 1.0(+14) | 0 | 1860 | | |
| $O_2 + CH_2 \rightarrow$ products<br>OXYGEN MOLECULE + METHYLENE FREE RADICAL<br>73 JEN/BAY2 REACTION ORDER: 2 $k/k_{ref}$: 0.095<br>NOTE: $k_{ref}$: $O + CH_2 \rightarrow CO + H + H$<br>75 PEE/VIN | 296<br>2000 | -<br>1.2(+13) | -<br>- | -<br>- | 0.7 | 1.3 |
| $O_2 + {}^3CH_2 \rightarrow$ products<br>OXYGEN MOLECULE + METHYLENE FREE RADICAL<br>77 PIL/ROB REACTION ORDER: 2<br>NOTE: $^3CH_2$ (GROUND STATE) | 298 | 7.2(+11) | - | - | | |
| $O_2 + {}^1CH_2^* + M \rightarrow$ products<br>OXYGEN MOLECULE + METHYLENE FREE RADICAL<br>74 LAU/BAS REACTION ORDER: 2 M: He<br>NOTE: LIMITING HIGH PRESSURE k. (UPPER LIMIT) | 298 | 1.8(+13) | - | - | | |
| $O_2 + {}^3CH_2^* + M \rightarrow$ products<br>OXYGEN MOLECULE + METHYLENE FREE RADICAL<br>74 LAU/BAS REACTION ORDER: 2 M: He<br>NOTE: $^3CH_2$ (GROUND STATE) LIMITING HIGH PRESSURE k | 298 | 9.0(+11) | - | - | 0.9 | 1.1 |
| $O_2 + CH_3 \rightarrow O + CH_3O.$<br>OXYGEN MOLECULE + METHYL FREE RADICAL<br>75 BRA/BRO REACTION ORDER: 2 | 1200-1800 | 2.4(+13) | 0 | 14500 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O_2 + CH_3 \rightarrow OH + HCHO$ | | | | | | |
| OXYGEN MOLECULE + METHYL FREE RADICAL | | | | | | |
| 75 BOW REACTION ORDER: 2 | 1900-2400 | 1.2(+11) | 0 | 5000 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| 76 WAS/DAY | 259-341 | 1.7(+11) | 0 | 940±250 | 0.4 | 2.2 |
| 76 TSU | 1500-2000 | 9.0(+11) | 0 | 6000 | | |
| ---------- | | | | | | |
| $O_2 + CH_3 + M \rightarrow CH_3O_2. + M$ | | | | | | |
| OXYGEN MOLECULE + METHYL FREE RADICAL | | | | | | |
| 71 VAN/CAL REACTION ORDER: 2 | 295 | 1.1(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k. (GIVEN WITH CAUTION) | | | | | | |
| M = $CH_3CH_2CH_3$ | | | | | | |
| 72 BAS/JAM REACTION ORDER: 3 M: $N_2$ | 295 | 9.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k | | | | | | |
| 72 BAS/JAM | 295 | 3.6(+17) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k. M=$(CH_3)_4C$ | | | | | | |
| REACTION ORDER: 2 | 295 | 3.1(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k; M:$N_2$,OR$(CH_3)_4C$ | | | | | | |
| 73 SCK/NIK REACTION ORDER: 3 M: He | | 3.9(+16) | - | - | | |
| NOTE: LOW PRESSURE k | | | | | | |
| REACTION ORDER: 2 M: He | 453 | 1.5(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 75 TAU/BAS2 | 298 | 1.0(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k. M=He,Ar,$N_2$ | | | | | | |
| 77 HPC/GHO M: $N_2$ | 295 | 1.3(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 77 PAR M: $N_2$ | 298 | 7.2(+11) | - | - | 0.3 | 1.7 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 298 | 1.1(+17) | - | - | 0.7 | 1.3 |
| NOTE: LOW PRESSURE k | 298 | 5.4(+17) | - | - | | |
| NOTE: LOW PRESSURE k; M=$(CH_3)_4C$ | | | | | | |
| ---------- | | | | | | |
| $O_2 + .CHO \rightarrow OH + CO_2$ | | | | | | |
| OXYGEN MOLECULE + METHYL, OXO-, FREE REDICAL | | | | | | |
| 76 OSI/HEI REACTION ORDER: 2 $k/k_{ref}$: ≤0.19 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + CH_3. \rightarrow HO_2. + CO$; UPPER LIMIT RATIO | | | | | | |
| ---------- | | | | | | |
| $O_2 + .CHO \rightarrow HO_2 + CO$ | | | | | | |
| OXYGEN MOLECULE + METHYL, OXO-, FREE RADICAL | | | | | | |
| 73 PLE/MAH1 REACTION ORDER: 2 | 1600 | 3.0(+13) | - | - | | |
| NOTE: TENTATIVE K | | | | | | |
| 74 WAS/MAR | 297 | 3.4(+12) | - | - | 0.8 | 1.2 |
| 77 SHI/EBA | 298 | 5.1(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_2 + .CHO \rightarrow HCO_3$ | | | | | | |
| OXYGEN MOLECULE + METHYL, OXO-, FREE RADICAL | | | | | | |
| 76 OSI/HEI REACTION ORDER: 2 $k/k_{ref}$: 5.0 | 296 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_2 + .CHO \rightarrow HO_2 + CO$ | | | | | | |
| ---------- | | | | | | |
| NOTE: $k_{ref}$: $O_2 + .CHO \rightarrow HO_2. + CO$ | | | | | | |
| ---------- | | | | | | |
| $O_2 + HCHO \rightarrow HO_2 + .CHO$ | | | | | | |
| OXYGEN MOLECULE + FORMALDEHYDE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 1.3(+1) | - | - | | |
| 74 BAL/FUL | 713-816 | 2.0(+13) | 0 | 19580±750 | | |
| ---------- | | | | | | |
| $O_2 + CH_3O. \rightarrow HO_2 + HCHO$ | | | | | | |
| OXYGEN MOLECULE + METHOXY FREE RADICAL | | | | | | |
| 73 WHE/VIL REACTION ORDER: 2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: NO + $CH_3O. \rightarrow HNO + HCHO + CH_3ONO$ | | | | | | |
| $k/k_{ref}$: $4.7 \times 10^{-5}$ | | | | | | |
| 75 AIC/MIL | 373 | 1.2(+9) | - | - | | |
| NOTE: OPTIMIZATION | 296 | - | - | - | 0.9 | 1.1 |
| 75 GLA | | | | | | |
| NOTE: $k_{ref}$: NO + $CH_3O. \rightarrow CH_2ONO$; $k/k_{ref}$=$5.2 \times 10^{-5}$ | | | | | | |
| 75 [illegible] | 296 | - | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $NO_2 + CH_3O. \rightarrow CH_3ONO_2$; $k/k_{ref}$: $7.4 \times 10^{-5}$ (UPPER LIMIT RATIO) | | | | | | |
| 75 WEA/MEA | 298 | 2.6(+9) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| 75 MIN/GOL | 300 | 3.5(+8) | - | - | | |
| 77 FAR/BEN | 396-442 | 3.2(+11) | 0 | 2000±1400 | 0.1 | 32 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $O_2 + CN \rightarrow O + NCO$ | | | | | | |
| OXYGEN MOLECULE + CYANOGEN FREE RADICAL | | | | | | |
| 72 BUI/COO1 REACTION ORDER: 2 | 300-377 | 6.7(+12) | - | - | | |
| NOTE: POSSIBLE SMALL NEGATIVE E | | | | | | |
| 74 SCH/SCH | 299-388 | 3.2(+13) | 0 | 500 | | |
| 75 AIB/HOY | 718-1111 | 3.2(+13) | 0 | 510±170 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $O_2 + CN(v=n) \rightarrow O + NCO$ | | | | | | |
| OXYGEN MOLECULE + CYANOGEN FREE RADICAL | | | | | | |
| 72 SCE/WOL2 REACTION ORDER: 2 | 298 | 4.7(+12) | - | - | | |
| NOTE: UNREPORTED T, ASSUMED TO BE 298K. k DECREASING TO $1.8 \times 10^{12} cm^3 mol^{-1} s^{-1}$ BETWEEN v=0 AND v=6 | | | | | | |
| 73 SCH/SCH1 | 298 | 6.3(+12) | - | - | | |
| NOTE: k DECREASES MONOTONICALLY FROM V=0 TO V=7: $k(V=7)=1.0 \times 10^{12} cm^3 mol^{-1} s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| $O_2 + CH_3O_2NO + CH_3O_2NO \rightarrow O_2 + CH_3ONO_2 + CH_3ONO_2$ | | | | | | |
| OXYGEN MOLECULE + PEROXYNITROUS ACID METHYL ESTER | | | | | | |
| 73 SPI/VIL REACTION ORDER: 3 | 298 | 3.8(+13) | - | - | | |
| ---------- | | | | | | |
| $O_2 + CH{=}C. \rightarrow CO + .CHO^*$ | | | | | | |
| OXYGEN MOLECULE + ETHYNYL FREE RADICAL | | | | | | |
| 72 MAT/SLA REACTION ORDER: 2 | 1100-2100 | - | - | 5500±5000 | | |
| ---------- | | | | | | |
| $O_2 + CH{=}C. \rightarrow CO_2 + CH^*$ | | | | | | |
| OXYGEN MOLECULE + ETHYNYL FREE RADICAL | | | | | | |
| 72 MAT/SLA REACTION ORDER: 2 | 1100-2100 | - | - | 12600±5000 | | |
| ---------- | | | | | | |
| $O_2 + CH_3CH_2. \rightarrow HO_2 + CH_2{=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + ETHYL FREE RADICAL | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 8.2(+10) | - | - | | |
| ---------- | | | | | | |
| $O_2 + .CH{=}C{=}O \rightarrow$ products | | | | | | |
| OXYGEN MOLECULE + ETHENYL, 2-OXO-, FREE RADICAL | | | | | | |
| 73 JEN/BAY2 REACTION ORDER: 2 $k/k_{ref}$: 0.018 | 296 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O + .CH{=}C{=}O \rightarrow$ products | | | | | | |
| | 296 | 2.2(+10) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $O_2 + CH_3C(O). \rightarrow CH_3C(O)OO.$ | | | | | | |
| OXYGEN MOLECULE + ETHYL, 1-OXO-, FREE RADICAL | | | | | | |
| 74 DIX/SKI1 REACTION ORDER: 2 | 336-357 | 1.2(+10) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $O_2 + CH_3CHO \rightarrow HO_2 + CH_3C(O).$ | | | | | | |
| OXYGEN MOLECULE + ACETALDEHYDE | | | | | | |
| 77 COL/NAE REACTION ORDER: 2 | 1030-1115 | 2.0(+13) | 0.5 | 21240±600 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $O_2 + CH_3CHO + M \rightarrow CH_3C(O)OOH + M$ | | | | | | |
| OXYGEN MOLECULE + ACETALDEHYDE | | | | | | |
| 76 BRY/LEV REACTION ORDER: 3 M: $O_3$ | 393-473 | 5.0(+17) | 0 | 7550±850 | | |
| ---------- | | | | | | |
| $O_2 + CH_3CH_2CH_2. \rightarrow OH + CH_3CH_2CHO$ | | | | | | |
| OXYGEN MOLECULE + PROPYL FREE RADICAL | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 1.1(+8) | - | - | | |
| ---------- | | | | | | |
| $O_2 + CH_3CH_2CH_2. \rightarrow OH + cy\text{-}(CH_3)CHCH_2O$ | | | | | | |
| OXYGEN MOLECULE + PROPYL FREE RADICAL | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 3.1(+9) | - | - | | |
| ---------- | | | | | | |
| $O_2 + CH_3CH_2CH_2. \rightarrow HO_2 + CH_3CH{=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + PROPYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 BAK/BAL — REACTION ORDER: 2 | 753 | 3.8(+10) | - | - | | |
| 71 BAL/LAN — REACTION ORDER: 2 | 723 | 5.8(+10) | - | - | | |
| $O_2 + (CH_3)_2CH\cdot \rightarrow HO_2 + CH_3CH{=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 76 BAL/CLE — REACTION ORDER: 2 $k/k_{ref}$: 3060 | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $H_2 + (CH_3)_2CH\cdot \rightarrow H + CH_3CH_2CH_3$ | | | | | | |
| REACTION ORDER: 2 $k/k_{ref}$: 7680 | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $D_2 + (CH_3)_2CH\cdot \rightarrow D + CH_3CHDCH_3$ | | | | | | |
| $O_2 + CH_3CH_2CHO \rightarrow HO_2 + CH_3CH_2C(O)\cdot$ | | | | | | |
| OXYGEN MOLECULE + PROPANAL | | | | | | |
| 71 BAL/LAN — REACTION ORDER: 2 | 713 | 7.6(+1) | - | - | | |
| $O_2^*(^1\Delta_g) + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_2{=}CHCH(CH_3)OOH$ | | | | | | |
| OXYGEN MOLECULE + cis-2-BUTENE | | | | | | |
| 75 ASH/OGR — REACTION ORDER: 2 | 300-500 | 1.3(+11) | 0 | 3255±140 | 0.7 | 1.4 |
| $O_2^*(^1\Delta_g) + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_2{=}CHCH(CH_3)OOH$ | | | | | | |
| OXYGEN MOLECULE + trans-2-BUTENE | | | | | | |
| 75 ASH/OGR — REACTION ORDER: 2 | 300-500 | 1.6(+11) | 0 | 3665±180 | 0.7 | 1.5 |
| $O_2 + CH_3CH_2CH_2CH_2\cdot \rightarrow OH + cy\text{-}CH_2CH_2CH_2CH_2O$ | | | | | | |
| OXYGEN MOLECULE + BUTYL FREE RADICAL | | | | | | |
| 75 BAK/BAL3 — REACTION ORDER: 2 | 753 | 2.6(+10) | - | - | | |
| $O_2 + CH_3CH_2CH_2CH_2\cdot \rightarrow HO_2 + CH_3CH_2CH{=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + BUTYL FREE RADICAL | | | | | | |
| 71 BAK/BAL — REACTION ORDER: 2 | 753 | 2.8(+11) | - | - | | |
| 75 BAK/BAL2 | 753 | 2.7(+11) | - | - | | |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow OH + CH_3CH_2COCH_3$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 BAK/BAL — REACTION ORDER: 2 | 753 | 2.3(+9) | - | - | | |
| 75 BAK/BAL3 | 753 | 9.4(+8) | - | - | | |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow OH + cy\text{-}(CH_3CH_2)CHCH_2O$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAK/BAL3 — REACTION ORDER: 2 | 753 | 1.2(+9) | - | - | 0.7 | 1.3 |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow OH + cis\text{-}[cy\text{-}(CH_3)CHCH(CH_3)]O$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAK/BAL3 — REACTION ORDER: 2 | 753 | 4.8(+9) | - | - | | |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow OH + trans\text{-}[cy\text{-}(CH_3)CHCH(CH_3)]O$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAK/BAL3 — REACTION ORDER: 2 | 753 | 1.0(+10) | - | - | | |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow HO_2 + CH_3CH_2CH{=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL- FREE RADICAL | | | | | | |
| 75 BAK/BAL2 — REACTION ORDER: 2 | 753 | 5.1(+10) | - | - | | |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow HO_2 + cis\text{-}CH_3CH{=}CHCH_3$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 BAK/BAL — REACTION ORDER: 2 | 753 | 1.2(+11) | - | - | | |
| 75 BAK/BAL2 | 753 | 4.3(+10) | - | - | | |
| $O_2 + CH_3CH_2CH(\cdot)CH_3 \rightarrow HO_2 + trans\text{-}CH_3CH{=}CHCH_3$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 BAK/BAL — REACTION ORDER: 2 | 753 | 2.1(+11) | - | - | | |
| 75 BAK/BAL2 | 753 | 7.8(+10) | - | - | | |
| $O_2 + (CH_3)_2CHCH_2\cdot \rightarrow OH + (CH_3)_2CHCHO$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 2-METHYL-, FREE RADICAL | | | | | | |
| 71 BAK/BAL — REACTION ORDER: 2 | 753 | 2.3(+9) | - | - | | |
| $O_2 + (CH_3)_2CHCH_2\cdot \rightarrow HO_2 + (CH_3)_2C{=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + PROPYL, 2-METHYL-, FREE RADICAL | | | | | | |
| 76 BAK/BAL — REACTION ORDER: 2 | 753 | 2.3(+10) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O_2^*(^1\Delta_g) + CH_3CH{=}C(CH_3)_2 \rightarrow CH_2{=}CHC(CH_3)_2OOH$ + $CH_2{=}C(CH_3)CH(CH_3)OOH$ | | | | | | |
| OXYGEN MOLECULE + 2-BUTENE, 2-METHYL- | | | | | | |
| 73 HUI/HER — REACTION ORDER: 2 | 298 | 3.3(+7) | - | - | | |
| 75 ASH/OGR | 300-500 | 1.3(+11) | 0 | 2465±140 | 0.7 | 1.4 |
| $O_2 + (CH_3)_2CHCH_2CH_3 \rightarrow HO_2 + (CH_3)_2C(.)CH_2CH_3$ + $(CH_3)_2CHCH(.)CH_3$ | | | | | | |
| OXYGEN MOLECULE + BUTANE, 2-METHYL- | | | | | | |
| 73 DIG/DEN — REACTION ORDER: 2 | 410-439 | 1.5(+15) | 0 | 19120 | | |
| $O_2^*(^1\Delta_g) + CH_3CH_2CH{=}C(CH_3)_2 \rightarrow CH_3CH{=}CHC(CH_3)_2OOH$ + $CH_3CH_2CH(OOH)C(CH_3){=}CH_2$ | | | | | | |
| OXYGEN MOLECULE + 2-PENTENE, 2-METHYL | | | | | | |
| 73 HUI/HER — REACTION ORDER: 2 | 298 | 9.0(+6) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $O_2^*(^1\Delta_g) + (CH_3)_2C{=}C(CH_3)_2 \rightarrow CH_2{=}C(CH_3)C(CH_3)_2OOH$ | | | | | | |
| OXYGEN MOLECULE + 2-BUTENE, 2,3-DIMETHYL | | | | | | |
| 72 ACK/PIT — REACTION ORDER: 2 | 298 | 4.9(+8) | - | - | 0.9 | 1.1 |
| NOTE: FOR PRESSURES > 3TORR | 298 | 7.6(+8) | - | - | | |
| 73 HUI/HER | 300-500 | 1.3(+11) | 0 | 1625±75 | 0.8 | 1.2 |
| 75 ASH/OGR | 298 | 2.0(+7) | - | - | | |
| 76 DUM | | | | | | |
| $O_2 + (CH_3)_2CHC(O.)(CH_3)_2 \rightarrow$ products | | | | | | |
| OXYGEN MOLECULE + PROPOXY, 1,1,2-TRIMETHYL-, FREE RADICAL | | | | | | |
| 75 ALC/MIL — REACTION ORDER: 2 | 373 | 1.2(+9) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| $O_2^*(^1\Delta_g) + (CH_3)_2C{=}CHN(CH_3)_2 \rightarrow CH_2{=}C(CH_3)CH(OOH)[N(CH_3)_2]$ | | | | | | |
| OXYGEN MOLECULE + 1-PROPEN-1-AMINE, N,N,2-TRIMETHYL- | | | | | | |
| 73 HUI/HER — REACTION ORDER: 2 | 298 | 1.5(+10) | - | - | | |
| $O_2^*(^1\Delta_g) + (CH_3)_2C{=}C(CH_3)CH_2CH_3 \rightarrow CH_2{=}C(CH_3)C(CH_2CH_3OOH$ + $CH_2{=}C.CH_2CH_3)C(CH_3)OOH$ | | | | | | |
| OXYGEN MOLECULE + 2-PENTENE, 2,3-DIMETHYL- | | | | | | |
| 73 HUI/HER — REACTION ORDER: 2 | 298 | 5.2(+8) | - | - | | |
| $O_2 + CH_3(CH_2)_5CH_3 \rightarrow HO_2 + [C_7H_{15}.]$ | | | | | | |
| OXYGEN MOLECULE + HEPTANE | | | | | | |
| 75 SHA/DEN — REACTION ORDER: 2 | 397-434 | 3.2(+17) | 0 | 21800±2000 | | |
| $O_2^*(^1\Delta_g) + (CH_3)_2C{=}C(CH_3)CH_2CH_2CH_3 \rightarrow$ $CH_2{=}C(CH_3)C(CH_2CH_2CH_3)(CH_3)OOH$ + $CH_2{=}C(CH_2CH_2CH_3)C(CH_3)_2OOH$ | | | | | | |
| OXYGEN MOLECULE + 2-HEXENE, 2,3-DIMETHYL- | | | | | | |
| 73 HUI/HER — REACTION ORDER: 2 | 298 | 5.0(+8) | - | - | | |
| $O2 + (CH_3O_3CCH_2CH(CH_3)_2 \rightarrow HO2 + (CH_3O_3CCH_2C(.)(CH_3)_2$ + $(CH_3)_3C(CH(.)CH(CH_3)_2$ | | | | | | |
| OXYGEN MOLECULE + PENTANE, 2,2,4-TRIMETHYL- | | | | | | |
| 73 DIG/DEN — REACTION ORDER: 2 | 400-465 | 1.0(+15) | 0 | 19120 | | |
| $O2^*(^1\Delta_g) + CH_3CH_2OCH{=}C(CH_2CH_3)CH_2CH_2CH_2CH_3 \rightarrow$ $CH_3CH{=}C(CH_2CH_2CH_2CH_3)CH(OCH_2CH_3)$ | | | | | | |
| OXYGEN MOLECULE + 1-HEXENE, 1-ETHOXY-2-ETHYL- | | | | | | |
| 73 HUI/HER — REACTION ORDER: 2 | 298 | 4.0(+8) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $O2 + M \rightarrow O + O + M$ | | | | | | |
| OXYGEN MOLECULE | | | | | | |
| 71 BRE/BIR — REACTION ORDER: 2 M: $O_2$ | 4000-8500 | 7.6(+14) | - | 52750 | | |
| NOTE: MEFF: $O_2$(9.6) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 BRE/BIR — M: He | 4000-8500 | 1.4(+14) | - | 53950 | | |
| NOTE: MEFF: HE(1.5±0.1) — M: Ar | 4000-8500 | 5.9(+13) | 0 | 51080 | | |
| NOTE: Meff: Ar(1.0±0.1) — M: Kr | 4000-8500 | 7.9(+13) | 0 | 5275 | | |
| NOTE: Meff: Kr(1.0) (STANDARD INERT GAS) | 4000-8500 | 1.1(+14) | 0 | 51840 | | |
| NOTE: Meff: Xe(1.7±0.1) | | | | | | |
| ---------- | | | | | | |
| ---------- | | | | | | |
| $O_3 + O \rightarrow O_2 + O_2$ | | | | | | |
| OZONE + OXYGEN ATOM | | | | | | |
| 71 FRE/SIM — REACTION ORDER: 2 | 197-299 | 7.2(+12) | 0 | 2165±100 | 0.8 | 1.2 |
| 72 EAL/EGO | 292-370 | 7.1(+12) | 0 | 1935±85 | 0.8 | 1.3 |
| 72 HUS/KIR1 | 300 | 7.8(+9) | - | - | 0.6 | 1.4 |
| 72 MCC | 269-409 | 1.1(+13) | 0 | 2245 | | |
| 72 MCC/KAU | 269-409 | 6.3(+12) | 0 | 2170±50 | 0.8 | 1.2 |
| 73 DAV/WON | 220-353 | 1.2(+13) | 0 | 2276±106 | 0.9 | 1.1 |
| 76 DAV | 293 | 7.2(+9) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_3 + O^*(^1D) \rightarrow O_2 + O_2$ | | | | | | |
| OZONE + OXYGEN ATOM | | | | | | |
| 71 GOL/GRE — REACTION ORDER: 2 $k/k_{ref}$: 4.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow N_2 + O_2 + NO + NO$. (AT 2288 Å) | | | | | | |
| 71 GOL/GRE — $k/k_{ref}$: 2.6 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow N_2 + O_2 + NO + NO$ (AT 2537 Å) | | | | | | |
| 73 HEI/HUS1 | 300 | 1.6(+14) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 3.9 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $O_3 + O^*(^1D) \rightarrow O_2 + O_2$ (OR $O_2 + O + O$) | | | | | | |
| OZONE + OXYGEN ATOM | | | | | | |
| 75 GAU/SNE — REACTION ORDER: 2 $k/k_{ref}$: 8.0 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow O_2^*(^1\Sigma_g^+) + O$ | 300 | 3.6(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 76 DAV/SAD | 298 | 1.4(+14) | - | - | 0.9 | 1.1 |
| 76 STR/HOW | 103-393 | 1.4(+14) | 0 | 0 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_3 + H \rightarrow O_2 + OH$ | | | | | | |
| OZONE + HYDROGEN ATOM | | | | | | |
| 77 CIY/MON — REACTION ORDER: 2 | 298-638 | 6.0(+13) | 0 | 224±26 | 0.8 | 1.3 |
| ---------- | | | | | | |
| $O_3 + OH \rightarrow O_2 + HO_2$ | | | | | | |
| OZONE + HYDROXYL FREE RADICAL | | | | | | |
| 73 AND/KAU2 — REACTION ORDER: 2 | 220-450 | 7.8(+11) | 0 | 956 | | |
| 73 DIM | 300 | 4.8(+10) | - | - | | |
| 73 KLR | 298 | 3.9(+10) | - | - | 0.8 | 1.2 |
| 74 SIM/HEI1 | 298 | >9.0(+9) | - | - | | |
| NOTE: LOWER LIMIT k. EVALUATION | | | | | | |
| 74 SIM/HEI1 | 298 | 3.0(+10) | - | - | 0.4 | 1.6 |
| NOTE: EVALUATION | | | | | | |
| 75 DIM | 271-333 | - | - | - | | |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$; $k/k_{ref}$: 16.8exp(-1233/T) | | | | | | |
| NOTE: EVALUATION | 271-333 | 1.5(+12) | 0 | 1233 | | |
| ---------- | | | | | | |
| $O_3 + OD(V=N) \rightarrow O_2 + DO_2$ | | | | | | |
| OZONE + HYDROXYL-D FREE RADICAL | | | | | | |
| 74 BAS/GRA — REACTION ORDER: 2 | 298 | 3.3(+12) | - | - | 0.8 | 1.2 |
| NOTE: UNREPORTED T. ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $O_3 + OH(V=2) \rightarrow$ products | | | | | | |
| OZONE + HYDROXYL FREE RADICAL | | | | | | |
| 71 GOL/WOR — REACTION ORDER: 2 | 298 | 1.1(+12) | - | - | 0.4 | 1.6 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K; K INCREASING TO $4.6 \times 10^{12} cm^3 mol^{-1} s^{-1}$ FROM v=2 TO v=9 | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O_3$ + OH(V=5) → products | | | | | | |
| OZONE + HYDROXYL FREE RADICAL | | | | | | |
| 71 FCT/CAL REACTION ORDER: 2 | 298 | 4.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| $O_3$ + OH(V=4) → products | | | | | | |
| OZONE + HYDROXYL FREE RADICAL | | | | | | |
| 76 STR/JOH REACTION ORDER> 2 | 300 | 2.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: K INCREASING TO $6.6 \times 10^{12} cm^3 mol^{-1} s^{-1}$ FOR OH(V=9). | | | | | | |
| $O_3$ + $HO_2$ → $O_2$ + $O_2$ + OH | | | | | | |
| OZONE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 72 DEM REACTION ORDER: 2 | 300 | 1.8(+9) | - | - | | |
| 73 AND/KAU2 | 220-450 | <3.0(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 73 SIM/HEI3 | 225-298 | 2.0(+10) | 0 | 1010 | | |
| NOTE: EVALUATION | | | | | | |
| 74 DEM/TSC | 273-342 | 1.2(+11) | 0 | 1560±250 | | |
| NOTE: EVALUATION | | | | | | |
| $O_3$ + S → $O_2$ + SO | | | | | | |
| OZONE + SULFUR ATOM | | | | | | |
| 75 CLY/TOW REACTION ORDER: 2 | 298 | 7.2(+12) | - | - | 0.7 | 1.3 |
| $O_3$(V=N) + SO → $O_2$ + $SO_2^*$ | | | | | | |
| OZONE + SULFUR MONOXIDE | | | | | | |
| 74 KAL/BRA REACTION ORDER: 2 $k/k_{ref}$: 2.4 | 300 | - | - | - | 0.8 | 1.3 |
| NOTE: $k_{ref}$: $O_3$ + SO → $O_2$ + $SO_2^*$ | | | | | | |
| $O_3$ + $SO_2$ → $O_2$ + $SO_3$ | | | | | | |
| OZONE + SULFUR DIOXIDE | | | | | | |
| 74 DAV/PRU REACTION ORDER: 2 | 300 | <6.0(+1) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O_3$ + $H_2S$ → $H_2O$ + $SO_2$ | | | | | | |
| OZONE + HYDROGEN SULFIDE | | | | | | |
| 75 BEC/INO REACTION ORDER: 2 | 298 | <1.2(+4) | - | - | | |
| NOTE: UPPER LIMIT k. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| 75 GIA/TOB1 | 293-343 | 4.9(+10) | 0 | 3420 | | |
| NOTE: ESTIMATE | | | | | | |
| 75 GIA/TOB2 | 298-343 | 1.6(+12) | 0 | 2620±600 | 0.2 | 6.3 |
| $O_3$ + NO → $O_2$ + $NO_2$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 73 GEO/ELL REACTION ORDER: 2 | 298 | 8.5(+9) | - | - | 0.9 | 1.1 |
| 73 STE/NIK1 | 298 | 1.0(10) | - | - | 0.9 | 1.1 |
| 74 BEC/SCH | 290 | 1.0(+10) | - | - | | |
| 74 DEM/CLY | 298 | 1.1(+10) | - | - | 0.9 | 1.1 |
| 75 BIR/SHO | 203-361 | 1.4(+12) | 0 | 1450±50 | 0.9 | 1.1 |
| 76 FRE/STE | 298 | 1.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: INCLUDES $O_3$(001) | | | | | | |
| $O_3$ + NO(V=1) → $O_2$ + $NO_2^*(^2B_1)$ | | | | | | |
| OZONE + NITROGEN OXIDE(NO) | | | | | | |
| 76 STE/FRE REACTION ORDER: 2 $k/k_{ref}$: 5.7 | 298 | - | - | - | 0.8 | 1.5 |
| NOTE: $k_{ref}$: $O_3$ + NO → $O_2$ + $NO_2^*(^2B_1)$ | | | | | | |
| $O_3$(V=1,2) + NO → $O_2$ + $NO_2$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 75 KUR/BRA REACTION ORDER: 2 | 153-373 | 1.2(+13) | 0 | 1525 | | |
| $O_3$(001) + NO → $O_2$ + $NO_2$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 76 GER/LIN REACTION ORDER: 2 | 308 | 5.4(+10) | - | - | 0.9 | 1.1 |
| $O_3$(001) + NO → $O_2$ + $NO_2^*$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 76 GER/LIN REACTION ORDER: 2 | 308 | 4.3(+9) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $O_3^{\ddagger}(C^1) + NO \rightarrow O_2 + NO_2^*$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 77 MCY/BAR REACTION ORDER: 2 $k/k_{ref}$: 7.6 | 300 | - | - | - | 0.7 | 1.2 |
| NOTE: $k_{ref}$: $O_3 + NO \rightarrow O_2 + NO_2^*$ | | | | | | |
| $O_3(V=N) + NO \rightarrow O_2 + NO_2^*$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 73 GOR/LIN REACTION ORDER: 2 | 350 | 1.5(+11) | - | - | 0.9 | 1.1 |
| $O_3(V=N) + NO \rightarrow O_2 + NO_2^*$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 74 BRA/KUR REACTION ORDER: 2 $k/k_{ref}$: 5.6 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_3 + NO \rightarrow O_2 + NO_2^*$ | | | | | | |
| $O_3(V=N) + NO \rightarrow O_2 + NO_2^{\ddagger}(^2A_1)$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 74 KUR/BRA REACTION ORDER: 2 $k/k_{ref}$: 17.1 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O_3 + NO \rightarrow O_2 + NO_2^{\ddagger}(^2A_1)$ | | | | | | |
| $O_3(V=N) + NO \rightarrow O_2 + NO_2^{\ddagger}(^2A_1) + NO_2^*(^2B_1)$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 74 KUR/BRA REACTION ORDER: 2 $k/k_{ref}$: 16.2 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_3 + NO \rightarrow O_2 + NO_2^{\ddagger}(^2A_1) + NO_2^*(^2B_1)$ | | | | | | |
| 74 KUR/BRA | 300 | 1.6(+11) | - | - | 0.9 | 1.1 |
| $O_3(V=N) + NO \rightarrow O_2 + NO_2^*(^2B_1)$ | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 74 KUR/BRA REACTION ORDER: 2 $k/k_{ref}$: 4.1 | 300 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $O_3 + NO \rightarrow O_2 + NO_2^*(^2B_1)$ | | | | | | |
| $O_3 + NO(V=N) \rightarrow$ products | | | | | | |
| OZONE + NITROGEN OXIDE (NO) | | | | | | |
| 76 STE/FRE REACTION ORDER: 2 $k/k_{ref}$: ≤22 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $O_3 + NO \rightarrow O_2 + NO_2(^2A_1)$ (UPPER LIMIT RATIO) | | | | | | |
| $O_3 + NO_2 \rightarrow O_2 + NO_3$ | | | | | | |
| OZONE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 73 STE/NIK1 REACTION ORDER: 2 | 298 | 3.9(+7) | - | - | 0.9 | 1.1 |
| 73 GRO/ELL | 298 | 4.7(+7) | - | - | 0.9 | 1.1 |
| 73 WU/MAR | 299 | 1.3(+7) | - | - | 0.9 | 1.2 |
| 74 DAV/PRU | 260-343 | 5.4(+10) | 0 | 2428±115 | 0.9 | 1.1 |
| 74 GRO/ELL | 298 | 1.9(+7) | - | - | 0.8 | 1.2 |
| 74 GEA/JOH | 231-298 | 8.1(+10) | 0 | 2466±30 | 0.9 | 1.1 |
| 74 HUI/HER | 259-362 | 9.4(+10) | 0 | 2509±76 | 0.7 | 1.3 |
| 74 BIC/SCH | 289 | 2.0(+7) | - | - | | |
| 75 HER/HUI | 259-363 | 9.4(+10) | 0 | 2509±76 | 0.7 | 1.3 |
| 75 GEA | 231-298 | 8.1(+10) | 0 | 2466±30 | 0.9 | 1.1 |
| $O_3 + CO \rightarrow O_2 + CO_2$ | | | | | | |
| OZONE + CARBON MONOXIDE | | | | | | |
| 72 ARI/WAR REACTION ORDER: 2 | 296 | <2.4(-1) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O_3 + CO \rightarrow$ products | | | | | | |
| OZONE + CARBON MONOXIDE | | | | | | |
| 73 STE/NIK2 REACTION ORDER: 2 | 298 | 6.0(+2) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O_3 + CH_3 \rightarrow O_2 + H + HCHO$ | | | | | | |
| OZONE + METHYL FREE RADICAL | | | | | | |
| 75 [illegible]M/HEI REACTION ORDER: 2 | 221-298 | 3.3(+12) | - | 530 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION | | | | | | |
| $O_3 + CH_4 \rightarrow$ products | | | | | | |
| OZONE + METHANE | | | | | | |
| 73 STE/NIK2 REACTION ORDER: 2 | 298 | 7.2(+2) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O_3 + HCHO \rightarrow HCO_3 + OH + HCO_2 + HO_2$ | | | | | | |
| OZONE + FORMALDEHYDE | | | | | | |
| 76 BKA/HEI REACTION ORDER: 2 | 298 | 1.3 | - | - | | |
| $O_3 + CH_3O. \rightarrow$ products | | | | | | |
| OZONE + METHOXY FREE RADICAL | | | | | | |
| 75 SIM/HEI REACTION ORDER: 2 | 298 | 1.2(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O_3 + CH_3O_2. \rightarrow$ products | | | | | | |
| OZONE + METHYLDIOXY FREE RADICAL | | | | | | |
| 75 SIM/HEI REACTION ORDER: 2 | 298 | 1.4(+7) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $O_3 + CH_3ONO \rightarrow O_2 + CH_3ONO_2$ | | | | | | |
| OZONE + NITROUS ACID METHYL ESTER | | | | | | |
| 76 HAS/FRE REACTION ORDER: 2 | 298-352 | 4.1(+11) | 0 | 5315±172 | 0.6 | 1.7 |
| $O_3 + CH{\equiv}CH \rightarrow$ products | | | | | | |
| OZONE + ETHYNE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 1.8(+4) | - | - | 0.8 | 1.2 |
| 73 STE/NIK2 REACTION ORDER: 2 | 298 | 5.2(+4) | - | - | 0.9 | 1.1 |
| 76 PAT/ATK REACTION ORDER: 2 | 297 | 2.3(+4) | - | - | 0.8 | 1.2 |
| $O_3 + CH_2{=}CH_2 \rightarrow [CH_2{=}CH_2.O_3]$ | | | | | | |
| OZONE + ETHENE | | | | | | |
| 76 TOB/TOB REACTION ORDER: 2 | 303 | 1.02(+6) | - | - | 0.9 | 1.1 |
| $O_3 + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| OZONE + ETHENE | | | | | | |
| 73 STE/WU REACTION ORDER: 2 | 299 | 9.3(+5) | - | - | 0.9 | 1.1 |
| 74 BEC/SCH | 280-360 | 7.2(+9) | 0 | 2500±100 | | |
| 74 FIN/PIT | 298 | 1.0(+6) | - | - | 0 | 2.0 |
| NOTE: IN $O_2$ CARRIER GAS | 298 | 5.0(+6) | - | - | 0.6 | 1.4 |
| NOTE: IN $N_2$ CARRIER GAS | | | | | | |
| 74 HER/HUI | 235-362 | 5.4(+9) | 0 | 2557±167 | 0.4 | 1.6 |
| 74 JAP/WU | 298 | 1.1(+6) | - | - | 0.9 | 1.1 |
| 76 JAP/WU | 299 | 1.1(+6) | - | - | 0.9 | 1.1 |
| 76 WIT | 298 | 8.8(+5) | - | - | | |
| $O_3 + CD_2{=}CD_2 \rightarrow$ products | | | | | | |
| OZONE + ETHENE-$d_4$ | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 1.4(+6) | - | - | 0.9 | 1.1 |
| $O_3 + CH_3CHO \rightarrow$ products | | | | | | |
| OZONE + ACETALDEHYDE | | | | | | |
| 73 STE/NIK2 REACTION ORDER: 2 | 298 | 2.0(+4) | - | - | 0.9 | 1.1 |
| $O_3 + CH_3CH_2ONO \rightarrow O_2 + CH_3CH_2ONO_2$ | | | | | | |
| OZONE + NITROUS ACID ETHYL ESTER | | | | | | |
| 76 HAS/FRE REACTION ORDER: 2 | 298-352 | 1.9(+8) | - | 2357±116 | 0.7 | 1.4 |
| $O_3 + CH_3C{\equiv}CH \rightarrow$ products | | | | | | |
| OZONE + 1-PROPYNE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 1.3(+4) | - | - | 0.5 | 1.5 |
| $O_3 + CH_2{=}C{=}CH_2 \rightarrow [CH_2{=}C{=}CH_2.O_3]$ | | | | | | |
| OZONE + 1,2-PROPADIENE | | | | | | |
| 74 TOB/TOB REACTION ORDER: 2 | 499-598 | 1.0(+9) | 0 | 2770±500 | | |
| $O_3 + CH_3CH{=}CH_2 \rightarrow$ products | | | | | | |
| OZONE + PROPENE | | | | | | |
| 72 CEX/PEN REACTION ORDER: 2 | 295 | 7.6(+6) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 STE/WU | 299 | 7.5(+6) | - | - | 0.9 | 1.1 |
| 74 BIC/SCH | 280-360 | 6.6(+9) | 0 | 1970±100 | | |
| 74 FIR/HUI | 235-362 | 3.7(+9) | 0 | 1897±109 | 0.6 | 1.4 |
| 76 JAP/WU | 299 | 7.8(+6) | - | - | 0.9 | 1.1 |
| 76 WIL | 298 | 5.8(+6) | - | - | | |
| --- | | | | | | |
| $O_3$ + $CD_3CD{=}CD_2$ → products | | | | | | |
| OZONE + PROPENE-$d_6$ | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 9.1(+6) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $O_3$ + $CH_3COCHO$ → products | | | | | | |
| OZONE + PROPANAL, 2-OXO- | | | | | | |
| 76 PAT/ATK REACTION ORDER: 2 | 297 | 6.6(+2) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $O_3$ + $CH_3CH_2C{\equiv}CH$ → products | | | | | | |
| OZONE + 1-BUTYNE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 2.4(+4) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| $O_3$ + $CH_3C{\equiv}CCH_3$ → products | | | | | | |
| OZONE + 2-BUTYNE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 2.0(+4) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $O_3$ + $CH_2{=}CHCH{=}CH_2$ → [$CH_2{=}CHCH{=}CH_2.O_3$] | | | | | | |
| OZONE + 1,3-BUTADIENE | | | | | | |
| 75 TOB/TOB REACTION ORDER: 2 | 273-343 | 6.3(+10) | 0 | 2920±400 | 0.3 | 3.0 |
| 74 BIC/SCH | 280-360 | 3.3(+10) | 0 | 2680±100 | | |
| 74 JAP/WU | 298 | 5.1(+6) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $O_3$ + $CH_3CH_2CH{=}CH_2$ → products | | | | | | |
| OZONE + 1-BUTENE | | | | | | |
| 75 HUI/HER REACTION ORDER: 2 | 225-363 | 1.8(+9) | 0 | 1686±20 | 0.9 | 1.1 |
| NOTE: IN 0.0015 TORR OF $O_2$ AS SCAVENGER | | | | | | |
| 74 JAP/WU | 298 | 7.5(+6) | - | - | 0.9 | 1.1 |
| 76 WIL | 298 | 5.6(+6) | - | - | | |
| --- | | | | | | |
| $O_3$ + $CH_3CH{=}CHCH_3$ → products | | | | | | |
| OZONE + 2-BUTENE | | | | | | |
| 74 BIC/SCH REACTION ORDER: 2 | 280-360 | 5.7(+9) | 0 | 1150±75 | | |
| NOTE: cis- AND trans-2-BUTENE MIXTURE | | | | | | |
| --- | | | | | | |
| $O_3$ + cis-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| OZONE + cis-2-BUTENE | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 9.7(+7) | - | - | 0.9 | 1.1 |
| 74 FIN/PIT | 298 | 6.3(+7) | - | - | 0.7 | 1.3 |
| NOTE: IN $O_2$ CARRIER GAS | | | | | | |
| 74 FIN/PIT | 298 | 1.5(+8) | - | - | 0.9 | 1.1 |
| NOTE: IN $N_2$ CARRIER GAS | | | | | | |
| 75 HUI/HER | 225-336 | 1.9(+9) | 0 | 956±54 | 0.8 | 1.2 |
| NOTE: IN 0.0075 TORR OF $O_2$ AS SCAVENGER | | | | | | |
| 76 WIL | 298 | 7.3(+6) | - | - | | |
| --- | | | | | | |
| $O_3$ + trans-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| OZONE + trans-2-BUTENE | | | | | | |
| 73 STE/WU | 299 | 1.7(+8) | - | - | 0.9 | 1.1 |
| 74 JAP/WU | 298 | 1.6(+8) | - | - | 0.9 | 1.1 |
| 75 HUI/HER | 225-363 | 3.6(+9) | 0 | 1051±43 | 0.9 | 1.2 |
| NOTE: IN 0.0075 TORR OF $O_2$ AS SCAVENGER | | | | | | |
| 76 JAP/WU | 299 | 1.5(+8) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $O_3$ + $(CH_3)_2C{=}CH_2$ → products | | | | | | |
| OZONE + 1-PROPENE, 2-METHYL- | | | | | | |
| 74 BIC/SCH REACTION ORDER: 2 | 283 | 1.1(+7) | - | - | | |
| 74 FIN/PIT | 298 | 5.4(+6) | - | - | 0.6 | 1.4 |
| NOTE: IN $O_2$ CARRIER GAS | | | | | | |
| | 298 | 3.6(+7) | - | - | 0.8 | 1.2 |
| NOTE: IN $N_2$ CARRIER GAS | | | | | | |
| 75 HUI/HER | 225-363 | 1.9(+9) | 0 | 1671±23 | 0.9 | 1.1 |
| NOTE: IN 0.0075 TORR OF $O_2$ AS SCAVENGER | | | | | | |
| 74 JAP/WU | 298 | 8.2(+6) | - | - | 0.9 | 1.1 |
| 76 WIL | 298 | 7.4(+6) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $O_3$ + $CH_3CH_2CH_2CH{=}CH_2$ → products | | | | | | |
| OZONE + 1-PENTENE | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 6.4(+6) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_3$ + $CH_3CH{=}C(CH_3)_2$ → products | | | | | | |
| OZONE + 2-BUTENE, 2-METHYL- | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 3.0(+8) | - | - | 0.9 | 1.1 |
| 75 BUI/HER | 227-363 | 3.8(+9) | 0 | 826±78 | 0.8 | 1.3 |
| NOTE: IN 0.0075 TORR OF $O_2$ AS SCAVENGER | | | | | | |
| ---------- | | | | | | |
| $O_3$ + $CH_3CH_2CH_2CH_2CH{=}CH_2$ → products | | | | | | |
| OZONE + 1-HEXENE | | | | | | |
| 72 COX/PEN REACTION ORDER: 2 | 295 | 8.2(+6) | - | - | | |
| 72 COX/PEN | 295 | 7.2(+6) | - | - | | |
| NOTE: IN $N_2$ ATMOSPHERE | | | | | | |
| 73 STE/WU | 299 | 6.6(+6) | - | - | 0.9 | 1.1 |
| 74 JAP/WU | 298 | 6.7(+6) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_3$ + $CH_3CH_2CH_2C(CH_3){=}CH_2$ → products | | | | | | |
| OZONE + 1-PENTENE, 2-METHYL- | | | | | | |
| 72 COX/PEN REACTION ORDER: 2 | 295 | 1.0(+7) | - | - | | |
| ---------- | | | | | | |
| $O_3$ + $(CH_3)_2CHCH_2CH{=}CH_2$ → products | | | | | | |
| OZONE + 1-PENTENE, 4-METHYL- | | | | | | |
| 72 COX/PEN REACTION ORDER: 2 | 295 | 6.4(+6) | - | - | | |
| ---------- | | | | | | |
| $O_3$ + $CH_3CH_2C(CH_3){=}CHCH_3$ → products | | | | | | |
| OZONE + cis-2-PENTENE, 3-METHYL- | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 2.7(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_3$ + $CH_3CH_2C(CH_3){=}CHCH_3$ → products | | | | | | |
| OZONE + trans-2-PENTENE, 3-METHYL- | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 3.4(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $O_3$ + $(CH_3)_2C{=}C(CH_3)_2$ → products | | | | | | |
| OZONE + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 9.1(+8) | - | - | 0.9 | 1.1 |
| 75 BUI/HER | 227-363 | 1.7(+9) | 0 | 294±196 | | |
| NOTE: IN 0.0075 TORR OF $O_2$ AS SCAVENGER | | | | | | |
| ---------- | | | | | | |
| $O_3$ + M* → O + $O_2$ + M | | | | | | |
| OZONE | | | | | | |
| 71 FIN/SNE REACTION ORDER: 2 | 283-321 | 2.7(+13) | 0 | 2830±180 | | |
| NOTE: $M^* = O_2^*(^1\Delta_g)$ | | | | | | |
| 72 BEC/GRO | 296-360 | 3.6(+13) | 0 | 2850±140 | | |
| NOTE: $M^* = O_2^*(^1\Delta_g)$ | | | | | | |
| 72 HUS/KIR1 REACTION ORDER: 2 | 300 | <6.0(+9) | - | - | | |
| NOTE: $M^* = O_2^*(^1\Delta_g)$ | | | | | | |
| 73 COL/HUS | 300 | 2.7(+9) | - | - | 0.7 | 1.3 |
| NOTE: $M^*$ IS $O_2^*(^1\Delta_g)$ | | | | | | |
| $O_3^*$ + $M^*$ → O + $O_2$ + M | | | | | | |
| OZONE | | | | | | |
| 74 KUR/BRA REACTION ORDER: 2 $k/k_{ref}$: 38 | 300 | - | - | - | 0.5 | 1.5 |
| NOTE: $M^* = O_2^*(^1\Delta)$ $k_{ref}$: $O_3$ + $M^*$ → O + $O_2$ + M | | | | | | |
| 74 SNE REACTION ORDER: 2 | 298 | 1.4(+13) | - | - | 0.8 | 1.2 |
| NOTE: $M = O_2^*(^1\Sigma_g^+)$ | | | | | | |
| ---------- | | | | | | |
| H + O → OH(v=1) | | | | | | |
| HYDROGEN ATOM + OXYGEN ATOM | | | | | | |
| 76 TIC REACTION ORDER: 2 | 298 | 2.7(+1) | - | - | | |
| ---------- | | | | | | |
| H + O + M → OH + M | | | | | | |
| HYDROGEN ATOM + OXYGEN ATOM | | | | | | |
| 76 TIC REACTION ORDER: 3 M: H | 298 | 5.8(+11) | - | - | | |
| M: $H_2$ | 298 | 6.2(+9) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| H + O + M → OH(v=1) + M<br>HYDROGEN ATOM + OXYGEN ATOM<br>76 MIC REACTION ORDER: 3 M: H | 298 | 1.5(+10) | - | - | | |
| ---------- | | | | | | |
| H + O + M → OH* + M<br>HYDROGEN ATOM + OXYGEN ATOM<br>76 KEI/MOR REACTION ORDER: 3 M: Ar | 1250-2000 | 1.0(+9) | 0 | 5540 | | |
| ---------- | | | | | | |
| $H + O_2 \rightarrow OH + O$<br>HYDROGEN ATOM + OXYGEN MOLECULE<br>71 BRA/BEL1 REACTION ORDER: 2 | 1150-1400 | 1.3(+14) | 0 | 8205±550 | 0.8 | 1.2 |
| 71 BRA/BEL2 | 30-90 | 1.4(+14) | 0 | 8255 | 0.9 | 1.1 |
| NOTE: RANKINE-HUGONIOT MEASUREMENTS IN SHOCK TUBE AT LOW T. | | | | | | |
| 71 BRE/ROY | 650-1000 | 2.3(+14) | 0 | 8455 | | |
| | 1128-1152 | 1.8(+14) | 0 | 8050 | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 73 KEC/MOI | 913-1473 | 2.7(+14) | 0 | 8355±235 | 0.8 | 1.2 |
| 73 SCH | 1250-2500 | 1.2(+17) | -0.9 | 8369 | | |
| 74 NAM/TRO | 839-924 | 4.8(+9) | - | - | | |
| NOTE: E NOT DETERMINED. WITHIN THE GIVEN T RANGE TOTAL k INCREASES FROM $4.8 \times 10^9$ TO $9.6 \times 10^9 cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 75 BEW | 1900-2400 | 6.0(+14) | 0 | 8450 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| ---------- | | | | | | |
| $D + O_2 \rightarrow OD + O$<br>DEUTERIUM ATOM + OXYGEN MOLECULE<br>75 AFP/APP REACTION ORDER: 2 | 1700-3100 | 3.1(+14) | 0 | 9935 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $H + O_2^*(^1\Delta_g) \rightarrow OH + O$<br>HYDROGEN ATOM + OXYGEN MOLECULE<br>72 SCP/$SCH_2$ REACTION ORDER: 2 | 300 | 1.5(+10) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $H + O_2 + M \rightarrow HO_2 + M$<br>HYDROGEN ATOM + OXYGEN MOLECULE<br>71 GAY/PRA REACTION ORDER: 3 M: Ar | 1750 | 1.2(+15) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: Ar(1.0) M: $H_2O$ | 1750 | 2.2(+16) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: $H_2O$( 18.0) M: $N_2$ | 1600 | 2.0(+15) | - | - | 0.8 | 1.2 |
| NOTE: MEAN T. M eff: $N_2$(2.0) | | | | | | |
| 71 HIK/EYR M: Ar | 298 | 5.9(+15) | - | - | 0.9 | 1.1 |
| 71 ESB M: $H_2$ | 298 | 4.7(+15) | - | - | | |
| M: He | 298 | 2.7(+15) | - | - | | |
| M: Ne | 298 | 5.8(+14) | - | - | | |
| M: Ar | 298 | 2.1(+15) | - | - | | |
| M: Kr | 298 | 3.9(+15) | - | - | | |
| 72 ABU/MIC M: $H_2$ | 298 | 4.4(+15) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $H_2$(2.0) | | | | | | |
| 72 ABU/MIC M: He | 298 | 2.7(+15) | - | - | 0.9 | 1.1 |
| NOTE: M eff: He(1.2) | | | | | | |
| 72 ABU/MIC M: Ne | 298 | 5.4(+14) | - | - | 0.8 | 1.2 |
| NOTE: M eff: Ne(0.2) | | | | | | |
| 72 ABU/MIC M: Ar | 298 | 2.2(+15) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Ar(1.0) | | | | | | |
| 72 ABU/MIC M: Kr | 298 | 4.0(+15) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Kr(1.8) | | | | | | |
| 72 JAC/HOU M: Ar | 948-1125 | 2.3(+15) | 0 | 0 | | |
| M: He | 203-404 | 2.4(+15) | 0 | -238±48 | 0.8 | 1.2 |
| M: He | 226 | 7.0(+15) | - | - | | |
| NOTE: M eff: He(1.0) M: $N_2$ | 226 | 3.2(+16) | - | - | | |
| NOTE: M eff: $N_2$(4.5) M: He | 298 | 5.7(+15) | - | - | | |
| NOTE: M eff: He(1.0) M: Ar | 298 | 5.7(+15) | - | - | | |
| NOTE: M eff: Ar(1.0) M: $N_2$ | 298 | 1.9(+16) | - | - | | |
| NOTE: M eff: $N_2$(3.4) M: $CH_4$ | 298 | 8.9(+16) | - | - | | |

| CHEMICAL REACTIONS | | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|---|
| NOTE:M eff: $CH_4$(15.7) | | | | | | | |
| 72 MEO/ALL | M: $H_2$ | 297 | 2.3(+16) | - | - | 0.8 | 1.2 |
| | M: He | 297 | 5.4(+15) | - | - | 0.9 | 1.1 |
| | M: Ar | 297 | 5.6(+15) | - | - | 0.9 | 1.1 |
| 72 WES/DEHI | | 298 | 6.8(+15) | - | - | 0.8 | 1.2 |
| NOTE: M=He, Ar; EVALUATION | | | | | | | |
| 73 PEE/MAHI | M: $O_2$ | 1900 | 2.5(+15) | - | - | | |
| 73 KEC/MOI | M: $H_2$ | 913-1473 | 3.2(+15) | 0 | -770±100 | 0.9 | 1.1 |
| 74 HAC/HOY2 | M: He | 300 | 5.0(+15) | - | - | 0.8 | 1.2 |
| 74 WEK/DAV | M: Ar | 220-360 | 2.4(+15) | 0 | -345±64 | 0.8 | 1.2 |
| NOTE:M eff: Ar(1.0) | M: Ar | 220 | 1.2(+16) | - | - | | |
| NOTE:M eff: $N_2$(2.7) | M: $N_2$ | 220 | 3.1(+16) | - | - | 0.8 | 1.2 |
| NOTE:M eff: He(0.93) | M: He | 298 | 6.8(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: Ar(1.0) | M: Ar | 298 | 7.1(+15) | - | - | | |
| NOTE:M eff: $H_2$(3.0) | M: $H_2$ | 298 | 2.1(+16) | - | - | 0.8 | 1.2 |
| NOTE:M eff: $N_2$(2.8) | M: $N_2$ | 298 | 2.0(+16) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $CH_4$(22.0) | M: $CH_4$ | 298 | 1.5(+17) | - | - | 0.6 | 1.4 |
| 75 VAS/MAK | M: He | 300 | 4.4(+15) | - | - | | |
| | M: Ar | 300 | 4.4(+15) | - | - | | |
| | M: Ar | 300 | 1.8(+16) | - | - | | |
| 76 HAC/WAG | M: He | 293 | 9.0(+15) | - | - | 0.9 | 1.1 |
| 77 SIA | M: Ar | 964-1075 | 2.2(+15) | 0 | 0 | 0.8 | 1.2 |
| NOTE: EVALUATION | M: Ar | 200-2200 | 2.1(+18) | -1 | 0 | | |
| NOTE: ALTERNATIVE T-DEPENDENT EXPRESSION (RECOMMENDED EVALUATION); M eff(Ar): 1.0 | M: $N_2$ | 980-1176 | 3.3(+15) | 0 | 0 | 0.8 | 1.2 |
| NOTE: EVALUATION | M: $N_2$ | 200-2000 | 6.7(+19) | -1.42 | 0 | | |
| NOTE: ALTERNATIVE T-DEPENDENT EXPRESSION (EVALUATION) M eff ($N_2$): 3.1 AT 300K DECREASING TO 1.5 ABOVE 1000K | | | | | | | |
| --- | | | | | | | |
| $D + O_2 + M \rightarrow DO_2 + M$ | | | | | | | |
| DEUTERIUM ATOM + OXYGEN MOLECULE | | | | | | | |
| 75 VAS/MAK REACTION ORDER: 3 | M: He | 300 | 4.4(+15) | - | - | | |
| | M: Ar | 300 | 4.4(+15) | - | - | | |
| | M: $CO_2$ | 300 | 1.7(+16) | - | - | | |
| --- | | | | | | | |
| $H + O_3 \rightarrow OH + O_2$ | | | | | | | |
| HYDROGEN ATOM + OZONE | | | | | | | |
| 77 CLY/MON REACTION ORDER: 2 | | 298-638 | 6.0(+13) | 0 | 224±26 | 0.8 | 1.3 |
| --- | | | | | | | |
| $H + H + M \rightarrow H_2 + M$ | | | | | | | |
| HYDROGEN ATOM | | | | | | | |
| 71 BEN/BLA | M: $H_2$ | 298 | 3.4(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $H_2$(1.0) | M: He | 298 | 4.4(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: He(1.3) | M: Ar | 298 | 5.8(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: Ar(1.7) | M: $N_2$ | 298 | 3.7(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $N_2$(1.1) | M: $N_2O$ | 298 | 3.1(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $N_2O$(9.0) GIVEN WITH CAUTION (POSSIBLE WALL EFFECT) | M: $CO_2$ | 298 | 5.4(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $CO_2$(1.6) | | | | | | | |
| 71 BEN/BLA REACTION ORDER: 3 | | 298 | 5.8(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $CH_4$(1.7) | | | | | | | |

| CHEMICAL REACTIONS | | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|---|
| 71 GAY/PRA REACTION ØRDER: 3 | | 1900 | 3.8(+14) | - | - | 0.9 | 1.1 |
| NØTE: MEAN T. M eff: AR(1.0) | M: $H_2Ø$ | 1900 | 2.3(+15) | - | - | 0.7 | 1.3 |
| NØTE: MEAN T M eff: $H_2Ø$( 6.0) | M: $N_2$ | 1650 | 3.9(+14) | - | - | 0.7 | 1.3 |
| NØTE: MEAN T. M eff: $N_2$(1.0) | M: He | 298 | 5.9(+15) | - | - | 0.8 | 1.2 |
| 73 AZA/BØR | M: Ar | 298 | 4.5(+15) | - | - | 0.8 | 1.2 |
| NØTE: RØØM TEMPERATURE, ASSUMED TØ BE 298K | M: $NH_3$ | 298 | 4.0(+16) | - | - | 0.9 | 1.1 |
| NØTE: RØØM TEMPERATURE, ASSUMED TØ BE 298K | M: $NH_3$ | 298 | 5.2(+16) | - | - | | |
| NØTE: EVALUATIØN | M: He | 77 | 4.4(+15) | - | - | 0.9 | 1.1 |
| NØTE: ALTERNATIVE EVALUATIØN | M: He | 298 | 2.5(+15) | - | - | 0.9 | 1.1 |
| 73 TRA/HAM | M: Ar | 77 | 9.9(+15) | - | - | 0.8 | 1.2 |
| | M: Ar | 298 | 3.3(+15) | - | - | 0.9 | 1.1 |
| | M: $H_2$ | 77 | 6.7(+15) | - | - | 0.9 | 1.1 |
| | M: $H_2$ | 298 | 2.9(+15) | - | - | 0.9 | 1.1 |
| 74 MAL/ØWE | | 1300-1700 | 1.0(+15) | 0 | 0 | 0.8 | 1.2 |
| 75 WAL/KAU | M: $H_2$ | 295 | 2.9(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $H_2$(1.0) | M: $H_2$ | 77-298 | 9.2(+16) | -0.6 | 0 | 0.9 | 1.1 |
| | M: He | 295 | 2.6(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: He(0.87) | M: He | 77-298 | 2.5(+16) | -0.4 | 0 | 0.9 | 1.1 |
| | M: Ar | 295 | 3.4(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: Ar(1.14) | M: Ar | 77-298 | 3.4(+17) | -0.81 | 0 | 0.9 | 1.1 |
| | M: $SF_6$ | 295 | 7.0(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $SF_6$(2.41) | M: $SF_6$ | 161-295 | 2.0(+20) | -1.8 | 0 | 0.9 | 1.1 |
| | M: $N_2$ | 295 | 3.3(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $N_2$(1.13) | M: $N_2$ | 77-295 | 6.7(+18) | -1.33 | 0 | 0.9 | 1.1 |
| | M: $CØ_2$ | 295 | 5.9(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $CØ_2$(2.02) | M: $CØ_2$ | 175-295 | 2.2(21) | -2.27 | 0 | 0.9 | 1.1 |
| | M: $CH_4$ | 295 | 5.6(+15) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $CH_4$(1.89) | M: $CH_4$ | 77-295 | 5.4(+18) | -1.2 | 0 | 0.9 | 1.1 |
| 76 LYN/SCH | M: $H_2$ | 298 | 3.1(+15) | - | - | 0.9 | 1.1 |
| | M: He | 298 | 2.5(+15) | - | - | 0.8 | 1.2 |
| | M: Ne | 298 | 2.1(+15) | - | - | 0.7 | 1.3 |
| | M: Ar | 298 | 2.9(+15) | - | - | 0.9 | 1.1 |
| | M: Kr | 298 | 3.7(+15) | - | - | 0.9 | 1.1 |
| | M: $N_2$ | 298 | 3.5(+15) | - | - | 0.8 | 1.2 |
| 77 MIT/IFR | M: He | 297 | 2.1(+15) | - | - | 0.9 | 1.1 |
| NØTE: ABOUT 25% p-$H_2$ FØRMED | | | | | | | |
| --- | | | | | | | |
| D + D + M → $D_2$ + M | | | | | | | |
| DEUTERIUM ATØM | | | | | | | |
| 73 AZA/BØR REACTIØN ØRDER: 3 | M: He | 298 | 4.0(+15) | - | - | 0.8 | 1.2 |
| NØTE: RØØM TEMPERATURE, ASSUMED TØ BE 298K | M: Ar | 298 | 2.9(+15) | - | - | 0.8 | 1.2 |
| 73 AZA/BØR | | | | | | | |
| NØTE: RØØM TEMPERATURE, ASSUMED TØ BE 298K | M: $D_2$ | 77 | 5.5(+15) | - | - | 0.9 | 1.1 |
| 73 TRA/HAM | M: $D_2$ | 298 | 2.2(+15) | - | - | 0.9 | 1.1 |
| --- | | | | | | | |
| H + HD → $H_2$ + D | | | | | | | |
| HYDRØGEN ATØM + DEUTERIUM HYDRIDE | | | | | | | |
| 72 NIK/MAI REACTIØN ØRDER: 2 | | 1000 | 1.4(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $H + D_2 \rightarrow HD + D$ | | | | | | |
| HYDROGEN ATOM + DEUTERIUM MOLECULE | | | | | | |
| 72 NIK/MAI REACTION ORDER: 2 | 1000 | 2.8(+13) | - | - | 0.9 | 1.1 |
| 75 APP/APP | 1860 | 4.0(+12) | - | - | | |
| | 2680 | 9.4(+12) | - | - | | |
| | 2730 | 1.0(+13) | - | - | | |
| 76 PRA/ROG1 | 274-1220 | 2.3(+3) | 3.2 | 2850±90 | 0.3 | 3.4 |
| --- | | | | | | |
| $D + H_2 \rightarrow DH + H$ | | | | | | |
| DEUTERIUM ATOM + HYDROGEN MOLECULE | | | | | | |
| 72 NIK/MAI REACTION ORDER: 2 | 1000 | 3.7(+13) | - | - | 0.0 | 1.1 |
| 73 MIT/LER REACTION ORDER: 2 | 167-346 | 1.6(+7) | 2.0 | 2698±20 | 0.9 | 1.1 |
| 75 APP/APP REACTION ORDER: 2 | 2600 | 1.5( 13) | - | - | | |
| 76 PRA/ROG1 REACTION ORDER: 2 | 274-1220 | 4.8(+5) | 2.5 | 2490±70 | 0.4 | 2.8 |
| --- | | | | | | |
| $D + HD \rightarrow D_2 + H$ | | | | | | |
| DEUTERIUM ATOM + DEUTERIUM HYDRIDE | | | | | | |
| 72 NIK/MAI REACTION ORDER: 2 | 1000 | 1.9(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $H + OH \rightarrow H_2O$ | | | | | | |
| HYDROGEN ATOM + HYDROXYL FREE RADICAL | | | | | | |
| 77 ZEL/ERL REACTION ORDER: 2 | 230-300 | 1.6(+10) | 0 | 0 | 0.8 | 1.2 |
| --- | | | | | | |
| $H + OH + M \rightarrow H_2O + M$ | | | | | | |
| HYDROGEN ATOM + HYDROXYL FREE RADICAL | | | | | | |
| 71 GAY/PRA REACTION ORDER: 3 | 1900 | 2.7(+15) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: Ar(1.0) | | | | | | |
| --- | | | | | | |
| M: $N_2$ | 1650 | 1.0(+16) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: $N_2$(4.0) | | | | | | |
| --- | | | | | | |
| 71 GAY/PRA M: $H_2O$ | 1900 | 4.9(+16) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: $H_2O$(~18.0) | | | | | | |
| 72 FRI/SUT REACTION ORDER: 2 | 2130 | 4.4(+10) | - | - | | |
| NOTE: RATE CONSTANT EXPRESSED AS : $K[M]=4.4\times10^{10}\ cm^3 mol^{-1} s^{-1}$; M=$O_2$,$N_2$,$H_2O$ | | | | | | |
| 77 ZEL/ERL M: He | 230-300 | 1.6(+23) | -2.6 | 0 | 0.3 | 1.7 |
| | 300 | 5.4(+16) | - | - | 0.7 | 1.3 |
| NOTE: M eff: He(1.0) M: Ar | 300 | 8.2(+16) | - | - | 0.7 | 1.3 |
| NOTE: M eff: Ar(1.5) M: $N_2$ | 300 | 1.7(+17) | - | - | 0.7 | 1.3 |
| NOTE: M eff: $N_2$(3.2±0.3) M: $CO_2$ | 300 | 3.3(+17) | - | - | 0.7 | 1.3 |
| NOTE: Meff: $CO_2$(6±1) | | | | | | |
| --- | | | | | | |
| $H + OH + M \rightarrow H_2O + M^*$ | | | | | | |
| HYDROGEN ATOM + HYDROXYL FREE RADICAL | | | | | | |
| 74 DAV/MCG M: OH | 1740-1860 | 8.3(+15) | 0 | 0 | 0.6 | 1.4 |
| --- | | | | | | |
| $H + HO_2 \rightarrow O + H_2O$ | | | | | | |
| HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL | | | | | | |
| 72 WES/DEH REACTION ORDER: 2 $k/k_{ref}$: 0.11 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow$ products. EVALUATION | | | | | | |
| --- | | | | | | |
| $H + HO_2 \rightarrow O + H_2O + OH + OH$ | | | | | | |
| HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL | | | | | | |
| 72 DAY/DIX REACTION ORDER: 2 $k/k_{ref}$: 6.5 | 300-1800 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow H_2 + O_2$. EVALUATION | | | | | | |
| --- | | | | | | |
| 73 DAY/THO REACTION ORDER: 2 $k/k_{ref}$: 6.6 | 300-1050 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow H_2 + O_2$. EVALUATION | | | | | | |
| --- | | | | | | |
| $H + HO_2 \rightarrow H_2 + O_2$ | | | | | | |
| HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 BEN/BLA REACTION ORDER: 2 $k/k_{ref}$: 0.75 | 298 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow OH + OH$ | | | | | | |
| 72 WES/DEH1 $k/k_{ref}$: 0.63 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow$ products. EVALUATION | | | | | | |
| 76 BAC/WAG | 293 | 6.7(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $H + HO_2 \rightarrow OH + OH$ | | | | | | |
| HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL | | | | | | |
| 72 WES/DEH1 REACTION ORDER: 2 $k/k_{ref}$: 0.27 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow$ products. EVALUATION | | | | | | |
| 76 BAC/WAG | 293 | 1.6(+13) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |
| $H + H_2O_2 \rightarrow H_2 + HO_2$ | | | | | | |
| HYDROGEN ATOM + HYDROGEN PEROXIDE | | | | | | |
| 73 GOK | 298 | 2.4(+8) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| 74 GOR/VOL REACTION ORDER: 2 | 298 | 1.9(+9) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $D + H_2O_2 \rightarrow HD + HO_2 + OH + HDO$ | | | | | | |
| DEUTERIUM ATOM + HYDROGEN PEROXIDE | | | | | | |
| 71 ALB/HOY REACTION ORDER: 2 | 294-464 | 7.0(+12) | 0 | 2100±200 | | |
| ---------- | | | | | | |
| $H + H_2O_2 \rightarrow OH + H_2O$ | | | | | | |
| HYDROGEN ATOM + HYDROGEN PEROXIDE | | | | | | |
| 72 GOR/VOL REACTION ORDER: 2 $k/k_{ref}$: 2.0 | 298 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $H + H_2O_2 \rightarrow H_2 + HO_2$. (CORRECTED $k/k_{ref}$ RATIO) | | | | | | |
| 73 GOK | 298 | 7.2(+8) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION $k/k_{ref}$: 3.0 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + H_2O_2 \rightarrow H_2 + HO_2$. (EVALUATION) | | | | | | |
| 74 GOR/VOL $k/k_{ref}$: 1.86 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $H + H_2O_2 \rightarrow H_2 + HO_2$. | | | | | | |
| 74 GOR/VOL | 298 | 3.4(+9) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | 283-353 | 3.1(+12) | 0 | 1400±140 | 0.6 | 1.4 |
| 75 KLE/PAY | 298 | - | - | - | | |
| 75 MEA/HEI $k/k_{ref}$: 1.3 | | | | | | |
| NOTE: $k_{ref}$: $H + H_2O_2 \rightarrow H_2 + HO_2$ | | | | | | |
| ---------- | | | | | | |
| $H + SH \rightarrow H_2 + S$ | | | | | | |
| HYDROGEN ATOM + MERCAPTO FREE RADICAL | | | | | | |
| 72 LAN/OLD REACTION ORDER: 2 | 293 | <6.0(+12) | - | - | | |
| NOTE: UPPER LIMIT K | | | | | | |
| 73 BRA/TRU | 298 | 2.5(+13) | - | - | | |
| 75 CUP/GLA | 295 | 1.5(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $H + H_2S \rightarrow H_2 + SH$ | | | | | | |
| HYDROGEN ATOM + HYDROGEN SULFIDE | | | | | | |
| 71 KUR/PET REACTION ORDER: 2 | 190-464 | 7.8(+12) | 0 | 860±30 | 0.9 | 1.1 |
| 72 ROM/SCH | 298 | 2.3(+11) | - | - | 0.8 | 1.3 |
| 73 BRA/TRU | 298 | 5.0(+11) | - | - | | |
| ---------- | | | | | | |
| $H + N + M \rightarrow NH + M$ | | | | | | |
| HYDROGEN ATOM + NITROGEN ATOM | | | | | | |
| 73 BRE REACTION ORDER: 3 | 298 | 1.8(+16) | - | - | 0.4 | 1.6 |
| NOTE: k CENTRAL VALUE OBTAINED BY AVERAGING $k<(6.4\pm1.5)\times10^{-32}$ AND $k>(3.1\pm1.0)\times10^{-32}\ cm^6 molecule^{-2} s^{-1}$. $M=N_2, H_2$ | | | | | | |
| ---------- | | | | | | |
| $H + NO \rightarrow N + OH$ | | | | | | |
| HYDROGEN ATOM + NITROGEN OXIDE (NO) | | | | | | |
| 75 FRA/GRA REACTION ORDER: 2 | 2530-3020 | 3.5(+14) | 0 | 23940 | | |
| 75 DUX/PRA | 2260-3250 | 2.6(+14) | 0 | 24560 | | |
| 75 FLE/HAN | 2400-4500 | 1.3(+14) | 0 | 24760±400 | 0.9 | 1.1 |
| 75 KOS/AND | 2000-4000 | 3.2(+13) | 0 | 24160±150 | 0.5 | 2.0 |
| 76 AND/ASA | 2300-3500 | 5.0(+13) | 0 | 24510 | 0.7 | 1.4 |
| NOTE: REEVALUATION | | | | | | |
| 76 MCC/KRU | 4750-2040 | 1.7(+14) | 0 | 24760 | 0.6 | 1.6 |
| 76 MCC/KRU | 1700-4300 | 1.3(+14) | 0 | 24077 | | |
| NOTE: RECOMMENDED K. | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 FLC/HAN | 2400-4200 | 2.2(+14) | 0 | 25400±300 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $H + NO + M \rightarrow HNO + M$ | | | | | | |
| HYDROGEN ATOM + NITROGEN OXIDE (NO) | | | | | | |
| 71 HIK/EYR REACTION ORDER: 3 M: $H_2$ | 298 | 1.4(+16) | - | - | 0.9 | 1.1 |
| 71 OSB M: $H_2$ | 298 | 2.3(+16) | - | - | | |
| M: He | 298 | 1.5(+16) | - | - | | |
| M: Ne | 298 | 7.9(+15) | - | - | | |
| M: Ar | 298 | 1.4(+16) | - | - | | |
| M: Kr | 298 | 2.0(+16) | - | - | | |
| 72 AHU/MIC M: He | 298 | 1.6(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: He(1.1) M: Ne | 298 | 7.6(+15) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Ne(0.5) M: Ar | 298 | 1.4(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Ar(1.0) M: Kr | 298 | 2.0(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Kr(1.4) M: $H_2$ | 298 | 2.6(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $H_2$(1.6) | | | | | | |
| 73 ATK/CVE M: $H_2$ | 285-390 | 8.9(+15) | 0 | -272±75 | 0.9 | 1.1 |
| 75 CAM/HAN2 M: Ar | 392 | 8.7(+15) | - | - | 0.9 | 1.1 |
| NOTE: M eff: Ar(1.0) | | | | | | |
| 75 CAM/HAN M: $N_2$ | 392 | 1.4(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $N_2$(1.64±0.12) | | | | | | |
| 77 OKA/SIN M: $H_2$ | 298 | 1.6(+16) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $H + NO_2 \rightarrow OH + NO$ | | | | | | |
| HYDROGEN ATOM + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 76 WAG/WEL REACTION ORDER: 2 | 240-460 | 4.3(+14) | 0 | 505±85 | 0.6 | 1.4 |
| 77 BEM/CLY | 298 | 6.8(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $H + NO_2 \rightarrow OH + NO$ | | | | | | |
| HYDROGEN ATOM + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 77 CLY/MON | 298-653 | 2.9(+14) | 0 | 174±31 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $H + N_2O \rightarrow OH + N_2$ | | | | | | |
| HYDROGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 73 BAL/GET REACTION ORDER: 2 $k/k_{ref}$: 0.64 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $H + O_2 \rightarrow OH + O$ | 773 | 2.6(+9) | - | - | 0.6 | 1.4 |
| NOTE: EVALUATION | | | | | | |
| 73 BAL/GET | 460-2500 | 1.6(+13) | 0 | 7600±500 | | |
| NOTE: EVALUATION 73 WAL1 $k/k_{ref}$: 0.64 | 773 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $H + O_2 \rightarrow OH + O$ | 773 | 2.6(+10) | - | - | 0.6 | 1.4 |
| NOTE: EVALUATION | 700-2500 | 7.6(+13) | 0 | 7600±500 | | |
| NOTE: EVALUATION (PREFERRED K) | | | | | | |
| 75 ALB/HGY | 718-1111 | 2.2(+14) | 0 | 8710±350 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $H + N_2O(v=3) \rightarrow OH + N_2$ | | | | | | |
| HYDROGEN ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 77 GEF/EGO REACTION ORDER: 2 | 298 | <6.0(+10) | - | - | | |
| NOTE: UPPER LIMIT k. | | | | | | |
| ---------- | | | | | | |
| $H + NH_2 + M \rightarrow NH_3 + M$ | | | | | | |
| HYDROGEN ATOM + AMIDOGEN FREE RADICAL | | | | | | |
| 71 GOK/MUL REACTION ORDER: 3 | 298 | 2.2(+18) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K. | | | | | | |
| ---------- | | | | | | |
| $H + NH_3 \rightarrow H_2 + NH_2$ | | | | | | |
| HYDROGEN ATOM + AMMONIA | | | | | | |
| 74 DEV/NIP REACTION ORDER: 2 | 1500-2150 | 2.8(+13) | 0 | 8760±650 | 0.7 | 1.4 |
| ---------- | | | | | | |
| $H + NH_2NH. \rightarrow NH_2. + NH_2.$ | | | | | | |
| HYDROGEN ATOM + HYDRAZYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 GEH/HØY — REACTIØN ØRDER: 2 | 300 | 1.6(+12) | - | - | 0.5 | 1.5 |
| $H + NH_2NH_2 \rightarrow H_2 + NH_2NH.$ | | | | | | |
| HYDREGEN ATØM + HYDRAZINE | | | | | | |
| 71 FRA/JØN — REACTIØN ØRDER: 2 | 300-540 | 1.5(+12) | 0 | 650±100 | 0.8 | 1.2 |
| 71 GEH/HØY | 213-473 | 1.3(+13) | 0 | 1260 | | |
| 75 YE | 298 | 1.5(+11) | - | - | | |
| 76 STI/PAY | 228-400 | 5.9(+12) | 0 | 1200±50 | 0.9 | 1.1 |
| $H + HN3 \rightarrow NH_2 + N_2$ | | | | | | |
| HYDREGEN ATØM + HYDRAZØIC ACID | | | | | | |
| 73 LEB/CØM — REACTIØN ØRDER: 2 | 300-460 | 1.5(+13) | 0 | 2315 | | |
| $H + HNØ \rightarrow H_2 + NØ$ | | | | | | |
| HYDREGEN ATØM + NITRØSYL HYDRIDE | | | | | | |
| 72 SMI — REACTIØN ØRDER: 2 | 2100 | 2.3(+12) | - | - | 0.5 | 1.5 |
| $H + HØNØ_2 \rightarrow$ products | | | | | | |
| HYDREGEN ATØM + NITRIC ACID | | | | | | |
| 74 CHA/WAY — REACTIØN ØRDER: 2 | 300 | <1.2(+9) | - | - | | |
| NØTE: UPPER LIMIT k | | | | | | |
| $H + CØ + M \rightarrow .CHØ + M$ | | | | | | |
| HYDREGEN ATØM + CARBØN MØNØXIDE | | | | | | |
| 71 BEN/BIA — REACTIØN ØRDER: 3 M: $H_2$ | 298 | <1.2(+14) | - | - | | |
| NØTE: UPPER LIMIT k. | | | | | | |
| 71 HIK/EYR — M: $H_2$ | 298 | 4.0(+13) | - | - | 0.8 | 1.2 |
| M: Ar | 298 | 2.6(+13) | - | - | 0.8 | 1.2 |
| 72 ABU/MIC — M: $H_2$ | 298 | 2.9(+13) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $H_2$(1.3) | | | | | | |
| 72 ABU/MIC — M: He | 298 | 2.2(+13) | - | - | 0.9 | 1.1 |
| NØTE: M eff: He(1.0) | | | | | | |
| M: Ne | 298 | 1.7(+13) | - | - | 0.9 | 1.1 |
| NØTE: M eff: Ne(0.8) | | | | | | |
| M: Ar | 298 | 2.2(+13) | - | - | 0.9 | 1.1 |
| NØTE: M eff: Ar(1.0) | | | | | | |
| 72 ABU/MIC — M: Kr | 298 | 2.5(+13) | - | - | 0.9 | 1.1 |
| NØTE: M eff: Kr(1.1) | | | | | | |
| 72 BAL/JAC — M: $H_2$ | 773 | 2.3(+14) | - | - | | |
| NØTE: EVALUATIØN | | | | | | |
| 73 AZA/AND — M: Ar | 298 | 4.0(+13) | - | - | 0.5 | 1.5 |
| 73 AZA/AND — M: CØ | 298 | 8.0(+13) | - | - | 0.7 | 1.3 |
| 77 WAN — M: $H_2$ | 298-373 | - | - | 100 | | |
| $H + CH_3 \rightarrow CH_4$ | | | | | | |
| HYDREGEN ATØM + METHYL FREE RADICAL | | | | | | |
| 72 TEN/JØN — REACTIØN ØRDER: 2 | 303-603 | 1.2(+12) | 0 | 25 | | |
| 74 CAM/MAK | 503-753 | 1.6(+12) | 0 | 0 | 0.7 | 1.3 |
| NØTE: AVERAGE ØF THREE k's AT 8, 12, AND 16 TØRR | | | | | | |
| 77 CBE/LEE | 308 | 1.5(14) | - | - | | |
| 77 CHI/YEH | 308 | 2.0(+14) | - | - | 0.6 | 1.5 |
| NØTE: EXTRAPOLATED LIMITING HIGH-PRESSURE k | | | | | | |
| $H + CH_3 + M \rightarrow CH_4 + M$ | | | | | | |
| HYDREGEN ATØM + METHYL FREE RADICAL | | | | | | |
| 74 PRA/VEL — REACTIØN ØRDER: 3 M: He | 295 | 5.3(+18) | - | - | 0.8 | 1.2 |
| 76 PRA/VEL1 — M: He | 321-521 | 6.9(+19) | -0.33 | 0 | 0.2 | 5.0 |
| 74 PRA/VEL — M: NØ | 295 | 2.0(+20) | - | - | 0.9 | 1.1 |
| $H + CH_4 \rightarrow H_2 + CH_3$ | | | | | | |
| HYDRAGEN ATØM + METHANE | | | | | | |
| 73 PEE/MAH1 — REACTIØN ØRDER: 2 | 1600 | 3.2(+12) | - | - | 0.8 | 1.2 |
| 75 CIA/DØV1 | 300-1800 | 2.2(+4) | 3.0 | 4400±20 | 0.9 | 1.1 |
| 75 RET/JUS | 1700-2300 | 7.2(+14) | 0 | 7600 | | |
| $H + .CHØ \rightarrow H_2 + CØ$ | | | | | | |
| HYDREGEN ATØM + METHYL, ØXØ-, FREE RADICAL | | | | | | |
| 73 MAC/THR — REACTIØN ØRDER: 2 $k/k_{ref}$: 4.0 | 300 | - | - | - | | |
| NØTE: $k_{ref}$: $k_1$(Ø + .CHØ → ØH + CØ) + $k_2$(Ø + .CHØ → H + $CØ_2$) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| H + HCHO → $H_2$ + CHO | | | | | | |
| HYDROGEN ATOM + FORMALDEHYDE | | | | | | |
| 72 FID/DAV — REACTION ORDER: 2 | 297 | 3.3(+10) | - | - | 0.9 | 1.1 |
| 72 WES/DEH$_2$ | 297-652 | 1.4(+13) | 0 | 1900 | | |
| H + $CH_3O$. → $H_2$ + HCHO | | | | | | |
| HYDROGEN ATOM + METHOXY FREE RADICAL | | | | | | |
| 77 MOO/SLE — REACTION ORDER: 2 $k/k_{ref}$: 0.31 | 223-398 | - | - | - | 0 | 2.0 |
| NOTE: $k_{ref}$: H + $CH_3O$. → $H_2$ + HCHO + OH + $CH_3$ (MOST PROBABLE RATIO) | | | | | | |
| H + $CH_3O$. → OH + $CH_3$ | | | | | | |
| HYDROGEN ATOM + METHOXY FREE RADICAL | | | | | | |
| 77 MOO/SLE — REACTION ORDER: 2 $k/k_{ref}$: 0.69 | 223-398 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: H + $CH_3O$ → $H_2$ + HCHO + OH + $CH_3$ (MOST PROBABLE RATIO) | | | | | | |
| H + $CH_3OH$ → $H_2$ + .$CH_2OH$ | | | | | | |
| HYDROGEN ATOM + METHANOL | | | | | | |
| 74 MEA/KIM — REACTION ORDER: 2 | 298-575 | 6.5(+12) | 0 | 2740±75 | | |
| NOTE: FLOW DISCHARGE METHOD WITH ESR DETECTION. k GIVEN WITH CAUTION | | | | | | |
| D + $CH_3OH$ → DH + .$CH_2OH$ | | | | | | |
| DEUTERIUM ATOM + METHANOL | | | | | | |
| 74 MEA/KIM — REACTION ORDER: 2 | 298-575 | 2.8(+13) | 0 | 2620±50 | 0.9 | 1.1 |
| NOTE: FLOW DISCHARGE METHOD WITH ESR DETECTION. k GIVEN WITH CAUTION | | | | | | |
| H + $CH_3OH$ → products | | | | | | |
| HYDROGEN ATOM + METHANOL | | | | | | |
| 71 ADE/WAG — REACTION ORDER: 2 | 295-653 | 2.3(+13) | 0 | 2670±150 | 0.9 | 1.1 |
| 73 ADE | 298-650 | 1.3(+13) | 0 | 2670 | | |
| H + $CH_3OOH$ → products | | | | | | |
| HYDROGEN ATOM + HYDROPEROXIDE, METHYL- | | | | | | |
| 77 SLE/WAR — REACTION ORDER: 2 | 250-358 | 1.7(+11) | 0 | 935±95 | 0.7 | 1.3 |
| H + COS → SH + CO | | | | | | |
| HYDROGEN ATOM + CARBON OXIDE SULFIDE | | | | | | |
| 72 REM/SCH — REACTION ORDER: 2 | 298 | 1.3(+10) | - | - | 0.8 | 1.3 |
| 75 TSU/YOK | 300-525 | 9.1(+12) | 0 | 1965±185 | 0.9 | 1.1 |
| 76 LEE | 298-478 | 9.8(+13) | 0 | 2775±40 | 0.9 | 1.1 |
| 77 LEE/STI | 261-500 | 5.5(+12) | 0 | 1940±55 | 0.8 | 1.2 |
| H + $CH_2$=N=N → $CH_3$ + N2 | | | | | | |
| HYDROGEN ATOM + METHANE, DIAZO- | | | | | | |
| 72 NIK/MOR2 — REACTION ORDER: 2 | 300 | 9.6(+12) | - | - | | |
| H + $CH_3NO_2$ → products | | | | | | |
| HYDROGEN ATOM + METHANE, NITRO- | | | | | | |
| 75 SLE/WAR2 — REACTION ORDER: 2 | 298-398 | 1.6(+12) | 0 | 1760±125 | 0.6 | 1.4 |
| H + $CH_3ONO$ → $H_2$ + .$CH_2ONO$ + HNO + $CH_3O$. | | | | | | |
| HYDROGEN ATOM + NITROUS ACID METHYL ESTER | | | | | | |
| 77 MOO/SLE — REACTION ORDER: 2 | 223-398 | 1.4(+11) | 0 | 956±55 | 0.8 | 1.2 |
| NOTE: k IS (53±5)% OF K(OVERALL) (SEE BELOW) | | | | | | |
| H + $CH_3ONO$ → NO + $CH_3OH$ | | | | | | |
| HYDROGEN ATOM + NITROUS ACID METHYL ESTER | | | | | | |
| 77 MOO/SLE — REACTION ORDER: 2 | 223-398 | 1.2(+11) | 0 | 956±55 | 0.8 | 1.2 |
| NOTE: k IS (47±5)% OF K(OVERALL) (SEE BELOW) | | | | | | |
| H + $CH_3ONO$ → NO + $CH_3OH$ + $H_2$ + .$CH_2ONO$ + HNO + $CH_3O$. | | | | | | |
| HYDROGEN ATOM + NITROUS ACID METHYL ESTER | | | | | | |
| 77 MOO/SLE — REACTION ORDER: 2 | 223-398 | 2.6(+11) | 0 | 956±55 | 0.8 | 1.2 |
| NOTE: OVERALL REACTION | | | | | | |
| H + CD≡CD → D + CH≡CD | | | | | | |
| HYDROGEN ATOM + ETHYNE-$d_2$ | | | | | | |
| 73 ROY/WAG — REACTION ORDER: 2 | 300-470 | 2.0(+13) | 0 | 2670±250 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| D + CH≡CH → H + CH≡CD<br>DEUTERIUM ATOM + ETHYNE<br>71 HOY/WAG<br>REACTION ORDER: 2 | 200-465 | 3.1(+13) | 0 | 1860±100 | | |
| H + CH≡CH → $H_2$ + CH≡C.<br>HYDROGEN ATOM + ETHYNE<br>74 YAM/LAV<br>71 OSB<br>REACTION ORDER: 2<br>REACTION ORDER: 2 | 1063-1233<br>298 | 4.8(+13)<br>2.7(+10) | 0<br>- | 8260±2000<br>- | 0.4 | 2.5 |
| H + CH≡CH → $CH_2$=CH.<br>HYDROGEN ATOM + ETHYNE<br>76 KEI/LYN | 298 | 6.3(+9) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT k INCREASING FROM $6.3\times10^{9}$ TO $1.3\times10^{10}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 1.0-10 TORR PRESSURE RANGE | | | | | | |
| H + CH≡CH → products<br>HYDROGEN ATOM + ETHYNE<br>76 KEI/LYN<br>REACTION ORDER: 2 | 298 | 2.7(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT k INCREASING FROM $2.7\times10^{10}$ TO $1.1\times10^{11}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 6.0-7.42 TORR PRESSURE RANGE | | | | | | |
| H + CD≡CD → products<br>HYDROGEN ATOM + ETHYNE-$d_2$<br>76 KEI/LYN<br>REACTION ORDER: 2 | 298 | 2.2(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT k INCREASING FROM $2.2\times10^{10}$ TO $3.5\times10^{10}$ $cm^3mol^{-1}s^{-1}$ WITH THE 1-5 TORR PRESSURE RANGE (IN EXCESS H) | 298 | 4.0(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT k INCREASING FROM $4.0\times10^{10}$ TO $5.8\times10^{10}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 1.2-5.6 TORR PRESSURE RANGE (IN EXCESS $C_2D_2$) | | | | | | |
| D + CH≡CH → H + CH≡CD<br>DEUTERIUM ATOM + ETHYNE<br>76 KEI/LYN<br>REACTION ORDER: 2<br>NOTE: AVERAGE k FOR PRESSURE RANGE 1-6.7 TORR | 298 | 7.3(+10) | - | - | 0.9 | 1.1 |
| D + CD≡CD → $CD_2$=CD.<br>DEUTERIUM ATOM + ETHYNE-$d_2$<br>76 KEI/LYN<br>REACTION ORDER: 2 | 298 | 6.6(+9) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT K INCREASING FROM $6.6\times10^{9}$ TO $1.1\times10^{10}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 1.0-5.6 TORR PRESSURE RANGE | | | | | | |
| H + CH≡CH + M → $CH_2CH$. + M<br>HYDROGEN ATOM + ETHYNE<br>76 FAY/STI<br>REACTION ORDER: 2 M: He<br>NOTE: LIMITING HIGH-PRESSURE k | 193-400 | 5.5(+12) | 0 | 1210±70 | 0.7 | 1.3 |
| H + $CD_2$=$CD_2$ → D + $CD_2$=CDH<br>HYDROGEN ATOM + ETHENE-$d_4$<br>74 YAM1<br>REACTION ORDER: 2<br>NOTE: AVERAGED k OVER GIVEN T RANGE | 1000-1200 | 6.8(+12) | - | - | 0.7 | 1.4 |
| H + $CH_2$=$CH_2$ → $H_1$ + $CH_2$=CH.<br>HYDROGEN ATOM + ETHENE<br>72 FAY/SUN<br>REACTION ORDER: 2 $k/k_{ref}$: ±0.0003 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: H. + $CH_2CH_2$ → $CH_3CH_2$. (UPPER LIMIT k)<br>73 PEE/MAH2<br>NOTE: EVALUATION | 1200-1700 | 1.1(+14) | 0 | 4280 | | |
| H + $CH_2$=$CH_2$ → $H_2$ + $CH_2$=CH.<br>HYDROGEN ATOM + ETHENE<br>74 YAM2<br>77 JUS/ROT<br>REACTION ORDER: 2<br>NOTE: TENTATIVE K | 1093-1213<br>1700-2000 | 1.9(+13)<br>5.0(+15) | 0<br>0 | 5185±1000<br>11500 | 0.4 | 2.5 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $H + CH_2{=}CH_2 \rightarrow CH_3CH_2\cdot$ | | | | | | |
| HYDROGEN ATOM + ETHENE | | | | | | |
| 71 OSB — REACTION ORDER: 2 | 298 | 3.7(+11) | - | - | | |
| 72 TEN/JON | 303-603 | 7.9(+11) | 0 | 365 | | |
| $H + CH_2{=}CH_2 \rightarrow CH_3CH_2\cdot{}^*$ | | | | | | |
| HYDROGEN ATOM + ETHENE | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 7.5(+11) | - | - | 0.9 | 1.1 |
| $H + CH_2{=}CH_2 \rightarrow CH_3CH_2V\cdot$ | | | | | | |
| HYDROGEN ATOM + ETHENE | | | | | | |
| 77 WAN — REACTION ORDER: 2 | 298-373 | - | - | 1000 | | |
| $H + CD_2{=}CD_2 \rightarrow CD_2HCD_2\cdot$ | | | | | | |
| HYDROGEN ATOM + ETHENE-$d_2$ | | | | | | |
| 71 OSB — REACTION ORDER: 2 | 298 | 5.4(+11) | - | - | | |
| 75 COW/MIC | 297 | 4.2(+11) | - | - | | |
| NOTE: IN EXCESS H, AT 1 TORR, k INCREASING TO $5.9\times10^{11}\ cm^{-3}mol^{-1}s^{-1}$ AT 4.9 TORR | | | | | | |
| $H + CD_2{=}CD_2 \rightarrow CD_2HCD_2\cdot{}^*$ | | | | | | |
| HYDROGEN ATOM + ETHENE-$d_4$ | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 6.9(+11) | - | - | 0.9 | 1.1 |
| $D + CH_2{=}CH_2 \rightarrow CH_2DCH_2\cdot$ | | | | | | |
| DEUTERIUM ATOM + ETHENE | | | | | | |
| 75 COW/MIC — REACTION ORDER: 2 | 297 | 4.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN EXCESS D. PRESSURE INDEPENDENT k WITHIN THE 1-5 TORR RANGE | | | | | | |
| 75 COW/MIC | 297 | 4.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN EXCESS $CH_2{=}CH_2$. STABLE K WITHIN THE 1-1.8 TORR PRESSURE RANGE, BUT INCREASING TO $7.3\times10^{11}\ cm^3mol^{-1}s^{-1}$ AT 4.2 TORR | | | | | | |
| $D + CH_2{=}CH_2 \rightarrow CH_2DCH_2\cdot{}^*$ | | | | | | |
| DEUTERIUM ATOM + ETHENE | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 5.2(+11) | - | - | 0.9 | 1.1 |
| $D + CD_2{=}CD_2 \rightarrow CD_3CD_2\cdot$ | | | | | | |
| DEUTERIUM ATOM + ETHENE-$d_4$ | | | | | | |
| 71 OSB — REACTION ORDER: 2 | 298 | 4.4(+11) | - | - | | |
| 75 COW/MIC | 297 | 1.3(+11) | - | - | | |
| NOTE: IN EXCESS D, AT 1 TORR. K INCREASING TO $2.8\times10^{11}\ cm^3mol^{-1}s^{-1}$ AT 5 TORR | | | | | | |
| $D + CD_2{=}CD_2 \rightarrow CD_3CD_2\cdot{}^*$ | | | | | | |
| DEUTERIUM ATOM + ETHENE-$d_4$ | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 5.1(+11) | - | - | 0.9 | 1.1 |
| $H + CH_2{=}CH_2 \rightarrow$ PRODUCTS | | | | | | |
| HYDROGEN ATOM + ETHENE | | | | | | |
| 74 LAU/BUE — REACTION ORDER: 2 | 298 | 2.5(+11) | - | - | | |
| $H + CH_2{=}CH_2 + M \rightarrow CH_3CH_2\cdot + M$ | | | | | | |
| HYDROGEN ATOM + ETHENE | | | | | | |
| 71 COW/KEI — REACTION ORDER: 2 | 298 | 2.3(+11) | - | - | 0.7 | 1.3 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD. 10-15 TORR PRESSURE M=Ne,Ar | | | | | | |
| 73 MIC/OSB | 298 | 9.7(+11) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| $H + CH_2{=}CH_2 + M \rightarrow CH_3CH_2\cdot{}^* + M$ | | | | | | |
| HYDROGEN ATOM + ETHENE | | | | | | |
| 71 BIK/CYW — REACTION ORDER: 2 | 298 | 5.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE k. M=$H_2$ OR Ar | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $H + CH_3CH_2\cdot \rightarrow H_2 + CH_2{=}CH_2$ | | | | | | |
| HYDROGEN ATOM + ETHYL FREE RADICAL | | | | | | |
| 74 CAM/MAR REACTION ORDER: 2 | 503-753 | 1.7(+12) | 0 | 0 | | |
| $H + CH_3CH_2\cdot \rightarrow CH_3 + CH_3$ | | | | | | |
| HYDROGEN ATOM + ETHYL FREE RADICAL | | | | | | |
| 72 TIN/JON REACTION ORDER: 2 | 303-603 | 1.1(+14) | 0 | 435 | | |
| 74 CAM/MAR | 503-753 | 3.7(+13) | 0 | 0 | | |
| 74 PEA/VEL | 295 | 4.3(+13) | - | - | 0.9 | 1.1 |
| 76 PEA/VEL1 | 321-521 | 6.6(+13) | 0 | 112±35 | 0.9 | 1.1 |
| $H + CH_3CH_3 \rightarrow H_2 + CH_3CH_2\cdot$ | | | | | | |
| HYDROGEN ATOM + ETHANE | | | | | | |
| 72 KAI/KOR REACTION ORDER: 2 | 1073-1173 | 3.3(+12) | - | - | 0.2 | 1.8 |
| 73 CLA/DOV1 | 300-1800 | 5.4(+2) | 3.5 | 2620±35 | 0.9 | 1.1 |
| 74 KAI/SHE | 1023-1123 | 2.4(+12) | - | - | 0.7 | 1.3 |
| 74 CAM/MAR | 290-1290 | 1.3(+14) | 0 | 4720±110 | 0.8 | 1.2 |
| NOTE: RECOMMENDED k | | | | | | |
| 74 CAM/MAR | 503-753 | 1.9(+14) | 0 | 4920±190 | 0.7 | 1.3 |
| 75 NAM/SHE | 800-900 | 1.5(+11) | - | - | 0.7 | 1.3 |
| $H + CH_2{=}C{=}O \rightarrow CH_3\cdot + CO$ | | | | | | |
| HYDROGEN ATOM + ETHENONE | | | | | | |
| 75 SLE/WAR1 REACTION ORDER: 2 | 218-363 | 3.6(+12) | 0 | 1180±100 | 0.6 | 1.4 |
| $H + CH_3C(O)\cdot \rightarrow H_2 + CH_2{=}C{=}O$ | | | | | | |
| HYDROGEN ATOM + ETHYL, 1-OXO-, FREE RADICAL | | | | | | |
| 75 SLE/WAR1 REACTION ORDER: 2 $k/k_{ref}$: 0.63 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3C(O)\cdot \rightarrow H_2 + CH_2{=}C{=}O + CH_3\cdot + .CHO$ | | | | | | |
| $H + CH_3C(O)\cdot \rightarrow CH_3\cdot + .CHO$ | | | | | | |
| HYDROGEN ATOM + ETHYL, 1-OXO-, FREE RADICAL | | | | | | |
| 75 SLE/WAR1 REACTION ORDER: 2 $k/k_{ref}$: 0.37 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3C(O)\cdot \rightarrow H_2 + CH_2{=}C{=}O + CH_3\cdot + .CHO$ | | | | | | |
| $H + CH_3CHO \rightarrow H_2 + CH_3C(O)\cdot$ | | | | | | |
| HYDROGEN ATOM + ACETALDEHYDE | | | | | | |
| 73 ADE/WAG1 REACTION ORDER: 2 | 295-389 | 2.6(+12) | 0 | 1310±75 | 0.9 | 1.1 |
| 75 SLE/WAR1 $k/k_{ref}$: 0.46 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_2{=}C{=}O \rightarrow CH_3\cdot + CO$ | | | | | | |
| 76 WEY/MIC2 | 298-500 | 1.3(+13) | 0 | 1660±60 | 0.8 | 1.2 |
| $H + CH_3CH_2OH \rightarrow H_2 + CH_3CH(.)OH$ | | | | | | |
| HYDROGEN ATOM + ETHANOL | | | | | | |
| 73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 4.4(+12) | 0 | 2300 | | |
| $H + CH_3CH_2OH \rightarrow H_2O + CH_3CH_2\cdot$ | | | | | | |
| HYDROGEN ATOM + ETHANOL | | | | | | |
| 73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 5.9(+11) | 0 | 1730 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $H + CH_3CH_2OH \rightarrow$ products | | | | | | |
| HYDROGEN ATOM + ETHANOL | | | | | | |
| 73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 4.2(+12) | 0 | 2115±150 | 0.9 | 1.1 |
| $H + (CH_3)_2O \rightarrow H_2 + .CH_2OCH_3$ | | | | | | |
| HYDROGEN ATOM + METHANE, OXYBIS- | | | | | | |
| 74 MEA/KIM REACTION ORDER: 2 | 300-404 | 1.3(+13) | 0 | 2360±50 | 0.6 | 1.4 |
| NOTE: FLOW DISCHARGE METHOD WITH MASS SPECTROMETRIC DETECTION | | | | | | |
| $D + (CH_3)_2O \rightarrow DH + .CH_2OCH_3$ | | | | | | |
| DEUTERIUM ATOM + METHANE, OXYBIS- | | | | | | |
| 74 MEA/KIM REACTION ORDER: 2 | 198-363 | 4.1(+13) | 0 | 2230±50 | 0.8 | 1.2 |
| NOTE: FLOW DISCHARGE METHOD WITH ESR DETECTION | | | | | | |
| k GIVEN WITH CAUTION | | | | | | |
| $H + cy\text{-}CH_2CH_2S \rightarrow H_2 + cy\text{-}CH_2SCH\cdot$ | | | | | | |
| HYDROGEN ATOM + THIIRANE | | | | | | |
| 76 LEE REACTION ORDER: 2 | 298 | 7.1(+11) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| H + cy-$CH_2CH_2S$ → SH + $CH_2$=$CH_2$<br>HYDROGEN ATOM + THIIRANE<br>75 YOK/AHM<br>77 LEE/STI — REACTION ORDER: 2 | 300-425<br>223-423 | 5.7(+13)<br>1.7(+13) | 0<br>0 | 978±88<br>946±12 | 0.9<br>0.9 | 1.1<br>1.1 |
| H + $(CH_3)_2S$ → $H_2$ + .$CH_2SCH_3$<br>HYDROGEN ATOM + METHANE, THIOBIS-<br>76 LEE — REACTION ORDER: 2 | 300 | 9.0(+10) | - | - | 0.7 | 1.3 |
| H + OC=C=CO → CO + OC=CH.<br>HYDROGEN ATOM + 1,2-PROPADIENE-1,3-DIONE<br>77 FAU/WAG1 — REACTION ORDER: 2 | 295-480 | 1.7(+13) | 0 | 1480±180 | 0.6 | 1.4 |
| H + $CH_3C$≡CH → $CH_3C(.)$=$CH_2$*<br>HYDROGEN ATOM + PROPYNE<br>72 WAG/ZEL2 — REACTION ORDER: 2 | 195-503 | 6.5(+12) | 0 | 1000±100 | 0.8 | 1.2 |
| H + $CH_3C$≡CH → $CH_3CH$=CH.*<br>HYDROGEN ATOM + PROPYNE<br>72 WAG/ZEL2 — REACTION ORDER: 2 | 195-503 | 5.8(+12) | 0 | 1560±125 | 0.8 | 1.2 |
| H + $CH_3C$≡CH → $CH_3CH$=CH. + $CH_3C(.)$=$CH_2$<br>HYDROGEN ATOM + PROPYNE<br>76 WBY/PAY — REACTION ORDER: 2 | 215-460 | 3.6(+13) | 0 | 1235±50 | 0.8 | 1.2 |
| H + $CH_2$=C=$CH_2$ → $CH_3C(.)$=$CH_2$*<br>HYDROGEN ATOM + 1,2-PROPADIENE<br>72 WAG/ZEL3 — REACTION ORDER: 2 | 273-470 | 8.5(+12) | 0 | 1000±100 | 0.8 | 1.2 |
| H + $CH_2$=C=$CH_2$ → .$CH_2CH$=$CH_2$*<br>HYDROGEN ATOM + 1,2-PROPADIENE<br>72 WAG/ZEL3 — REACTION ORDER: 2 | 273-470 | 4.0(+12) | 0 | 1360±200 | 0.5 | 1.5 |
| H + $CH_3CH$=$CH_2$ → $H_2$ + .$CH_2CH$=$CH_2$<br>HYDROGEN ATOM + PROPENE<br>72 FAL/SUN — REACTION ORDER: 2 $k/k_{ref}$: 0.002<br>NOTE: H + $CH_3CH$=$CH_2$ → $(CH_3)_2CH$. + $CH_3CH_2CH_2$. | 298 | - | - | - | | |
| H + $CH_3CH$=$CH_2$ → $CH_3$. + $CH_2$=$CH_2$<br>HYDROGEN ATOM + PROPENE<br>72 KAL/KOR — REACTION ORDER: 2 | 1073-1173 | 4.5(+12) | - | - | 0.8 | 1.2 |
| H + $CH_3CH$=$CH_2$ → $CH_3CH_2CH_2$.*<br>HYDROGEN ATOM + PROPENE<br>72 WAG/ZEL1 — REACTION ORDER: 2 | 195-390 | 4.4(+12) | 0 | 1385±100 | 0.9 | 1.1 |
| H + $CH_3CH$=$CH_2$ → $(CH_3)_2CH$.*<br>HYDROGEN ATOM + PROPENE<br>72 WAG/ZEL1<br>74 IAU/BUE — REACTION ORDER: 2 $k/k_{ref}$: 1.79<br>NOTE: $k_{ref}$: H + $CH_2$=$CH_2$ → $CH_3CH_2$.* | 195-390<br>298 | 5.4(+12)<br>- | 0<br>- | 630±50<br>- | 0.9<br>0.96 | 1.1<br>1.04 |
| H + $CH_3CH$=$CH_2$ → $CH_3CH(.)CH_3$* + $CH_3CH_2CH_2$.*<br>HYDROGEN ATOM + PROPENE<br>75 MIH/SCH — REACTION ORDER: 2 | 295 | 1.0(+12) | - | - | 0.9 | 1.1 |
| D + $CH_3CH$=$CH_2$ → $CH_3CHDCH_2$.<br>DEUTERIUM ATOM + PROPENE<br>77 YAN — REACTION ORDER: 2 $k/k_{ref}$: 0.65<br>NOTE: $k_{ref}$: D + $CH_3CH$=$CH_2$ → $CH_3CH(.)CH_2D$ | 1260-1390 | - | - | - | 0.8 | 1.2 |
| D + $CH_3CH$=$CH_2$ → $CH_3CH(.)CH_2D$* + $CH_3CHDCH_2$.*<br>DEUTERIUM ATOM + PROPENE<br>75 MIH/SCH — REACTION ORDER: 2 | 295 | 6.9(+11) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $H + CH_3CH{=}CH_2 + M \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + M$ | | | | | | |
| HYDROGEN ATOM + PROPENE | | | | | | |
| 71 COW/KEI REACTION ORDER: 2 M: He | 298 | 4.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD k INCREASING TO $4.8 \times 10^{11}\ cm^3 mol^{-1} s^{-1}$ FROM 1 TO 5 TORR PRESSURES. | | | | | | |
| 71 COW/KEI | 298 | 5.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD 10-15 TORR PRESSURE. M = Ne, Ar | | | | | | |
| 71 DAB/NIK M: He | 298 | 4.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: 1.0 TO 2.4 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $D + CH_3CH{=}CH_2 + M \rightarrow CH_3CH(.)CH_2D + CH_3CHDCH_2. + M$ | | | | | | |
| DEUTERIUM ATOM + PROPENE | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 6.2(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 TO 2.2 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2CH_3 \rightarrow H_2 + (CH_3)_2CH. + CH_3CH_2CH_2.$ | | | | | | |
| HYDROGEN ATOM + PROPANE | | | | | | |
| 76 SPE/KAL REACTION ORDER: 2 | 1123 | 3.7(+12) | - | - | | |
| 77 LED/VIL | 295 | 1.5(+8) | - | - | | |
| ---------- | | | | | | |
| $H + (CH_3)_2CO \rightarrow H_2 + CH_3COCH_2.$ | | | | | | |
| HYDROGEN ATOM + 2-PROPANONE | | | | | | |
| 72 AZA/GYU REACTION ORDER: 2 | 843-928 | 2.3(+14) | 0 | 7000±750 | 0.6 | 1.4 |
| $H + CH{=}CC{=}CH \rightarrow [.CH{=}CHC{=}CH + CH_2{=}(.)C{=}CH]$ | | | | | | |
| HYDROGEN ATOM + 1,3-BUTADIYNE | | | | | | |
| 75 SCH/WAR REACTION ORDER: 2 | 298 | 1.3(+12) | - | - | | |
| ---------- | | | | | | |
| $H + CH_2{=}CHCH{=}CH_2 + M \rightarrow CH_3CH(.)CH{=}CH_2 + .CH_2CH_2CH{=}CH_2 + M$ | | | | | | |
| HYDROGEN ATOM + 1,3-BUTADIENE | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 5.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: 1.3 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $D + CH_2{=}CHCH{=}CH_2 + M \rightarrow CH_2DCH(.)CH{=}CH_2 + .CH_2CHDCH{=}CH_2 + M$ | | | | | | |
| DEUTERIUM ATOM + 1,3-BUTADIENE | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 3.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: 1.6 TO 2.6 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2CH{=}CH_2 \rightarrow H_2 + CH_3CH(.)CH{=}CH_2$ | | | | | | |
| HYDROGEN ATOM + 1-BUTENE | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.016 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(.)CH_3$ | | | | | | |
| HYDROGEN ATOM + 1-BUTENE | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2.$ | | | | | | |
| HYDROGEN ATOM + 1-BUTENE | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 15.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH_2CH{=}CH_2 \rightarrow H_2 + CH_3CH(.)CH{=}CH_2 + .CH_2CH_2CH{=}CH_2$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2CH{=}CH_2 + M \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2. + M$ | | | | | | |
| HYDROGEN ATOM + 1-BUTENE | | | | | | |
| 71 COW/KEI REACTION ORDER: 2 M: He | 298 | 6.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD. 2.9 TORR PRESSURE | | | | | | |
| 71 COW/KEI | 298 | 7.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD. 10-15 TORR PRESSURE M = Ne, Ar | | | | | | |
| 71 DAB/NIK M: He | 298 | 8.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.4 TO 2.8 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $D + CH_3CH_2CH{=}CH_2 + M \rightarrow CH_3CH_2CH(.)CH_2D + CH_3CH_2CHDCH_2. + M$ | | | | | | |
| DEUTERIUM ATOM + 1-BUTENE | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 8.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 TO 2.6 TORR He PRESSURE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $H + CH_3CH{=}CHCH_3 \rightarrow CH_3CH(.)CH_2CH_3$ | | | | | | |
| HYDROGEN ATOM + 2-BUTENE | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 5.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH{=}CHCH_3 \rightarrow H_2 + .CH_2CH{=}CHCH_3$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH{=}CHCH_3 \rightarrow CH_3CH_2CH(.)CH_3^{*}$ | | | | | | |
| HYDROGEN ATOM + 2-BUTENE | | | | | | |
| 74 LAU/BUE REACTION ORDER: 2 $k/k_{ref}$: 0.83 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $H + CH_2{=}CH_2 \rightarrow CH_3CH_2 9^{*}$ | | | | | | |
| ---------- | | | | | | |
| $H + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow H_2 + .CH_2CH{=}CHCH_3$ | | | | | | |
| HYDROGEN ATOM + cis-2-BUTENE | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.015 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3CH_2CH(.)CH_3$ | | | | | | |
| ---------- | | | | | | |
| $H + cis\text{-}CH_3CH{=}CHCH_3 + M \rightarrow CH_3CH_2CH(.)CH_3 + M$ | | | | | | |
| HYDROGEN ATOM + cis-2-BUTENE | | | | | | |
| 71 CEW/KEI REACTION ORDER: 2 M: He | 298 | 3.9(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD. 3.2 TORR PRESSURE | | | | | | |
| 71 CEW/KEI | 298 | 2.4(+11) | - | - | 0.8 | 1.2 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD 10-15 TORR PRESSURE | | | | | | |
| M = Ne, Ar | | | | | | |
| 71 DAB/NIK | 298 | 4.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: 1.1 TO 2.8 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $D + cis\text{-}CH_3CH{=}CHCH_3 + M \rightarrow CH_3CHDCH(.)CH_3 + M$ | | | | | | |
| DEUTERIUM ATOM + cis-2-BUTENE | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 | 298 | 4.1(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 TO 2.6 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $H + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow H_2 + .CH_2CH{=}CHCH_3$ | | | | | | |
| HYDROGEN ATOM + trans-2-BUTENE | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.009 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3CH_2CH(.)CH_3$ | | | | | | |
| ---------- | | | | | | |
| $H + trans\text{-}CH_3CH{=}CHCH_3 + M \rightarrow CH_3CH_2CH(.)CH_3 + M$ | | | | | | |
| HYDROGEN ATOM + trans-2-BUTENE | | | | | | |
| 71 CEW/KEI REACTION ORDER: 2 M: He | 298 | 4.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD 1.8 TORR PRESSURE | | | | | | |
| 71 CEW/KEI | 298 | 3.3(+11) | - | - | 0.7 | 1.3 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD 10-15 TORR PRESSURE | | | | | | |
| M = Ne, Ar | | | | | | |
| 71 DAB/NIK M: He | 298 | 5.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.4 TO 1.9 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $D + trans\text{-}CH_3CH{=}CHCH_3 + M \rightarrow CH_3CHDCH(.)CH_3 + M$ | | | | | | |
| DEUTERIUM ATOM + trans-2-BUTENE | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 4.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.7 TO 2.2 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $H + (CH_3)_2C{=}CH_2 \rightarrow H_2 + .CH_2C(CH_3){=}CH_2$ | | | | | | |
| HYDROGEN ATOM + 1-PROPENE, 2-METHYL- | | | | | | |
| 76 BRA/WES2 REACTION ORDER: 2 | 1055-1325 | - | - | - | 0.7 | 1.5 |
| NOTE: $k_{ref}$: $H + (CH_3)_2C{=}CH_2 \rightarrow (CH_3)_3C.$ | | | | | | |
| $k/k_{ref}$: $6.8 \times 10^{-2}$ exp(2400/T) | | | | | | |
| ---------- | | | | | | |
| $H + (CH_3)_2C{=}CH_2 \rightarrow (CH_3)_3C.$ | | | | | | |
| HYDROGEN ATOM + 1-PROPENE,-2-METHYL-. | | | | | | |
| 76 BRA/WES1 REACTION ORDER: 2 | 1030-1300 | 1.6(+13) | 0 | 760 | 0.5 | 1.9 |
| ---------- | | | | | | |
| $H + (CH_3)_2C{=}CH_2 + M \rightarrow (CH_3)_3C. + (CH_3)_2CHCH_2. + M$ | | | | | | |
| HYDROGEN ATOM + 1-PROPENE,2-METHYL- | | | | | | |
| 71 CEW/KEI REACTION ORDER: 2 | 298 | 2.0(+12) | - | - | 0.7 | 1.3 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD 10-15 TORR PRESSURE | | | | | | |
| M = Ne, Ar | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| D + $(CH_3)_2C{=}CH_2$ + M → $(CH_3)_2C(.)CH_2D$ + $(CH_3)_2CHDCH_2$. + M<br>DEUTERIUM ATOM + 1-PROPENE, 2-METHYL-<br>71 DAB/NIK REACTION ORDER: 2 M: He<br>NOTE: 1.0 TO 2.2 TORR He PRESSURE | 298 | 2.0(+12) | - | - | 0.9 | 1.1 |
| H + $(CH_3)_3COH$ → $H_2O$ + $(CH_3)_3C$.<br>HYDROGEN ATOM + 2-PROPANOL, 2-METHYL-<br>73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 4.0(+13) | 0 | 4125±300 | 0.9 | 1.1 |
| H + $CH_3CH_2CH_2CH{=}CH_2$ → $CH_3CH_2CH_2CH(.)CH_3$<br>HYDROGEN ATOM + 1-PENTENE<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2CH_2CH{=}CH_2$ → $CH_3CH_2CH_2CH_2CH_2$. | 923 | - | - | - | | |
| H + $CH_3CH_2CH_2CH{=}CH_2$ → $CH_3CH_2CH_2CH(.)CH_3$ + $CH_3CH_2CH_2CH_2CH_2$.<br>HYDROGEN ATOM + 1-PENTENE<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 9.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2CH_2CH{=}CH_2$ + $H_2$ + $CH_3CH_2CH(.)CH{=}CH_2$<br>+ $.CH_2CH_2CH_2CH{=}CH_2$ + $CH_3CH(.)CH_2CH{=}CH_2$ | 923 | - | - | - | | |
| H + $CH_3CH_2CH_2CH{=}CH_2$ + M → $CH_3CH_2CH_2CH(.)CH_3$<br>+ $CH_3CH_2CH_2CH_2CH_2$. + M<br>HYDROGEN ATOM + 1-PENTENE<br>71 CEW/KEI REACTION ORDER: 2 M: He<br>NOTE: DISCHARGE FLOW METHOD 3.0 TORR PRESSURE<br>71 CEW/KEI<br>NOTE: STEADY STATE PHOTOLYSIS METHOD 10-15 TORR PRESSURE<br>M = Ne, Ar | 298<br>298 | 6.4(+11)<br>7.8(+11) | -<br>- | -<br>- | 0.9<br>0.7 | 1.1<br>1.3 |
| H + $CH_3CH_2CH{=}CH_2CH_3$ → $CH_3CH_2CH(.)CH_2CH_3$<br>HYDROGEN ATOM + 2-PENTENE<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 1.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2CH{=}CHCH_3$ → $CH_3CH_2CH_2CH(.)CH_3$ | 923 | - | - | - | | |
| H + $CH_3CH_2CH{=}CHCH_3$ → $CH_3CH_2CH(.)CH_2CH_3$ + $CH_3CH_2CH_2CH(.)CH_3$<br>HYDROGEN ATOM + 2-PENTENE<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2CH{=}CHCH_3$ → $H_2$ + $CH_3CH_2CH{=}CHCH_2$.<br>+ $CH_3CH(.)CH{=}CHCH_3$ + $CH_2CH_2CH{=}CHCH_3$ | 923 | - | - | - | | |
| H + $CH_3CH_2C(CH_3){=}CH_2$ → $CH_3CH_2C(.)(CH_3)_2$<br>HYDROGEN ATOM + 1-BUTENE, 2-METHYL-<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 4.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2C(CH_3){=}CH_2$ → $CH_3CH_2CH(CH_3)CH_2$. | 923 | - | - | - | | |
| H + $CH_3CH_2C(CH_3){=}CH_2$ → $CH_3CH_2C(.)(CH_3)_2$ + $CH_3CH_2CH(CH_3)CH_2$.<br>HYDROGEN ATOM + 1-BUTENE, 2-METHYL-<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 13.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2C(CH_3){=}CH_2$ → $H_2$ + $CH_3CH(.)C(CH_3){=}CH_2$<br>+ $.CH_2CH_2C(CH_3){=}CH_2$ + $CH_3CH_2C(CH_2.){=}CH_2$ | 923 | - | - | - | | |
| H + $CH_3CH_2C(CH_3){=}CH_2$ + M → $CH_3CH_2C(.)(CH_3)_2$<br>+ $CH_3CH_2CH(CH_3)CH_2$. + M<br>HYDROGEN ATOM + 1-BUTENE, 2-METHYL-<br>71 DAB/NIK REACTION ORDER: 2 M: He<br>NOTE: 0.7 TO 1.3 TORR He PRESSURE | 298 | 9.1(+11) | - | - | 0.9 | 1.1 |
| D + $CH_3CH_2C(CH_3){=}CH_2$ + M → $CH_3CH_2C(.)(CH_3)CH_2D$<br>+ $CH_3CH_2CD(CH_3)CH_2$. + M<br>DEUTERIUM ATOM + 1-BUTENE, 2-METHYL-<br>71 DAB/NIK REACTION ORDER: 2<br>NOTE: 1.2 TO 2.6 TORR He PRESSURE | 298 | 2.1(+12) | - | - | 0.9 | 1.1 |
| H + $(CH_3)_2CHCH{=}CH_2$ + M → $(CH_3)_2CHCH(.)CH_3$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| + $(CH_3)_2CHCH_2CH_2\cdot$ + M<br>HYDROGEN ATOM + 1-BUTENE, 3-METHYL-<br>71 DAB/NIK REACTION ORDER: 2 M: He<br>NOTE: 0.6 TO 2.7 TORR He PRESSURE | 298 | 7.3(+11) | - | - | 0.9 | 1.1 |
| D + $(CH_3)_2CHCH{=}CH_2$ + M → $(CH_3)_2CHCH(\cdot)CH_2D$<br>+ $(CH_3)_2CHCHDCH_2\cdot$ + M<br>DEUTERIUM ATOM + 1-BUTENE, 3-METHYL-<br>71 DAB/NIK REACTION ORDER: 2 M: He<br>NOTE: 0.6 TO 2.6 TORR He PRESSURE | 298 | 7.6(+11) | - | - | 0.9 | 1.1 |
| H + $CH_3CH{=}C(CH_3)_2$ → $CH_3CH_2C(\cdot)(CH_3)_2$<br>HYDROGEN ATOM + 2-BUTENE, 2-METHYL-<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 4.0<br>NOTE: $k_{ref}$: H + $CH_3CH{=}C(CH_3)_2$ → $CH_3CH(\cdot)CH(CH_3)_2$ | 923 | - | - | - | | |
| H + $CH_3CH{=}C(CH_3)_2$ → $CH_3CH_2C(\cdot)(CH_3)_2$*<br>HYDROGEN ATOM + 2-BUTENE, 2-METHYL-<br>74 LAU/BUE REACTION ORDER: 2 $k/k_{ref}$: 1.25<br>NOTE: $k_{ref}$: H + $CH_2{=}CH_2$ → $CH_3CH_2\cdot$* | 298 | - | - | - | 0.8 | 1.4 |
| H + $CH_3CH{=}C(CH_3)_2$ → $CH_3CH_2C(\cdot)(CH_3)_2$ + $CH_3CH(\cdot)CH(CH_3)_2$<br>HYDROGEN ATOM + 2-BUTENE, 2-METHYL-<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: H + $CH_3CH{=}C(CH_3)_2$ → $H_2$ + $CH_3CH{=}C(CH_3)CH_2\cdot$<br>+ $\cdot CH_2CH{=}C(CH_3)_2$ | 923 | - | - | - | | |
| H + $CH_3CH{=}C(CH_3)_2$ + M → $CH_3CH(\cdot)CH(CH_3)_2$<br>+ $CH_3CH_2C(\cdot)(CH_3)_2$ + M<br>HYDROGEN ATOM + 2-BUTENE, 2-METHYL-<br>71 DAB/NIK REACTION ORDER: 2 M: He<br>NOTE: 0.7 TO 1.3 TORR He PRESSURE | 298 | 8.2(+11) | - | - | 0.9 | 1.1 |
| D + $CH_3CH{=}C(CH_3)_2$ + M → $CH_3CH(\cdot)CD(CH_3)_2$<br>+ $CH_3CHDC(\cdot)(CH_3)_2$ + M<br>DEUTERIUM ATOM + 2-BUTENE, 2-METHYL-<br>71 DAB/NIK REACTION ORDER: 2<br>NOTE: 0.6 TO 2.6 TORR He PRESSURE | 298 | 9.2(+11) | - | - | 0.9 | 1.1 |
| H + $CH_3CH_2CH_2CH_3$ → $H_2$ + $CH_3CH_2CH(\cdot)CH_3$ + $CH_3CH_2CH_2CH_2\cdot$<br>HYDROGEN ATOM + BUTANE<br>75 NAM/SHE REACTION ORDER: 2<br>76 YAM/NAM REACTION ORDER: 2 | 800-850<br>980-1050 | 1.6(+13)<br>9.6(+11) | -<br>- | -<br>- | 0.8<br>0.7 | 1.2<br>1.3 |
| H + $(CH_3)_4C$ → $H_2$ + $(CH_3)_3CCH_2\cdot$<br>HYDROGEN ATOM + PROPANE, 2,2-DIMETHYL-<br>76 BAK/BAL REACTION ORDER: 2 $k/k_{ref}$: 52.0<br>NOTE: $k_{ref}$: H + $O_2$ → OH + O (OPTIMIZATION) | 753 | - | - | - | | |
| 76 BAK/BAL<br>NOTE: EVALUATION | 753 | 2.4(+11) | - | - | | |
| H + $CH_3CH_2CH_2C(CH_3){=}CH_2$ → $CH_3CH_2CH_2C(\cdot)(CH_3)_2$<br>HYDROGEN ATOM + 1-PENTENE, 2-METHYL-<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 4.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2CH_2C(CH_3){=}CH_2$ → $CH_3CH_2CH_2CH(CH_3)CH_2\cdot$ | 923 | - | - | - | | |
| H + $CH_3CH_2CH_2C(CH_3){=}CH_2$ → $CH_3CH_2CH_2C(\cdot)(CH_3)_2$<br>+ $CH_3CH_2CH_2CH(CH_3)CH_2\cdot$<br>HYDROGEN ATOM + 1-PENTENE, 2-METHYL-<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 8.0<br>NOTE: $k_{ref}$: H + $CH_3CH_2CH_2C(CH_3){=}CH_2$ →<br>$H_2$ + $CH_3CH_2CH(\cdot)C(CH_3){=}CH_2$ + $\cdot CH_2CH_2CH_2C(CH_3){=}CH_2$<br>+ $CH_3CH_2CH_2C(CH_2\cdot){=}CH_2$ | 923 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| $H + CH_3CH_2CH{=}C(CH_3)_2 \rightarrow CH_3CH_2CH_2C(.)(CH_3)_2$ | | | | | | |
| HYDROGEN ATOM + 2-PENTENE, 2-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH_2CH{=}C(CH_3)_2 \rightarrow CH_3CH_2CH(.)CH(CH_3)_2$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2CH{=}C(CH_3)_2 \rightarrow CH_3CH_2CH_2C(.)(CH_3)_2$ | | | | | | |
| $+ CH_3CH_2CH(.)CH(CH_3)_2$ | | | | | | |
| HYDROGEN ATOM + 2-PENTENE, 2-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH_2CH{=}C(CH_3)_2 \rightarrow$ | | | | | | |
| $H_2 + CH_3CH_2CH{=}C(CH_3)CH_2. + CH_3CH(.)CH{=}C(CH_3)_2$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2C(CH_3){=}CHCH_3 \rightarrow CH_3CH_2C(.)(CH_3)CH_2CH_3$ | | | | | | |
| HYDROGEN ATOM + 2-PENTENE, 3-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $H + CH_3CH_2C(CH_3){=}CHCH_3 \rightarrow CH_3CH_2CH(CH_3)CH(.)CH_3$ | | | | | | |
| ---------- | | | | | | |
| $H + CH_3CH_2C(CH_3){=}CHCH_3 \rightarrow CH_3CH_2C(.)(CH_3)CH_2CH_3$ | | | | | | |
| $+ CH_3CH_2CH(CH_3)CH(.)CH_3$ | | | | | | |
| HYDROGEN ATOM + 2-PENTENE, 3-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ODER: 2 | 923 | - | - | - | | |
| NOTE: KREF: $H + CH_3CH_2C(CH_3){=}CHCH_3 \rightarrow$ | | | | | | |
| $H_2 + CH_3CH_2C(CH_3){=}CHCH_2. + CH_3CH(.)C(CH_3){=}CHCH_3$ | | | | | | |
| $+ CH_3CH_2C(CH_2.){=}CHCH_3$ | | | | | | |
| ---------- | | | | | | |
| $H + (CH_3)_2C{=}C(CH_3)_2 + M \rightarrow (CH_3)_2C(.)CH(CH_3)_2 + M$ | | | | | | |
| HYDROGEN ATOM + 2-BUTENE, 2,3-DIMETHYL | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 7.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.7 TO 1.3 TORR HE PRESSURE | | | | | | |
| ---------- | | | | | | |
| $D + (CH_3)_2C{=}C(CH_3)_2 + M \rightarrow (CH_3)_2C(.)CD(CH_3)_2 + M$ | | | | | | |
| DEUTERIUM ATOM + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 | 298 | 8.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 TO 2.6 TORR He PRESSURE | | | | | | |
| ---------- | | | | | | |
| $H_2 + O \rightarrow H + OH$ | | | | | | |
| HYDROGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 71 EKA/BELI REACTION ORDER: 2 | 1200-1600 | 3.0(+13) | 0 | 4930±650 | 0.8 | 1.2 |
| 72 SCH/GET $k/k_{ref}$: 4.0 | 1700-2000 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O_2 + H \rightarrow O + OH$ | | | | | | |
| 72 SCH/GET | 1700 | 4.5(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 73 GET | 1400-1900 | 3.2(+14) | 0 | 7550 | 0.7 | 1.3 |
| 74 NAM/TRO | 839-924 | 7.2(+10) | - | - | | |
| NOTE: E NOT DETERMINED. WITHIN THE GIVEN T RANGE TOTAL k | | | | | | |
| INCREASES FROM $7.2\times10^{10}$ TO $1.3\times10^{11}$ $cm^3mol^{-1}s^{-1}$ | | | | | | |
| 74 KAW/GAR | 1200-2000 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + OH \rightarrow H_2O + O$; $k/k_{ref}$: 2.9EXP(-3250/T) | | | | | | |
| | 1200-2000 | 1.6(+14) | 0 | 6810 | | |
| NOTE: REEVALUATION | | | | | | |
| 74 SCH/GET $k/k_{ref}$: 3.6 | 1400-1900 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $H + O_2 \rightarrow OH + O$ | | | | | | |
| | 1400-1900 | 2.2(+14) | 0 | 6920 | 0.8 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| 75 CAM/HAN2 | 303-490 | 3.1(+13) | 0 | 4950±300 | 0.8 | 1.2 |
| 75 DUB/MCK | 347-832 | 5.3(+12) | 0 | 4200±240 | 0.4 | 1.6 |
| NOTE: BY AIR AFTERGLOW. | | | | | | |
| | 347-832 | 5.0(+12) | 0 | 4330±240 | 0.5 | 1.5 |
| NOTE: BY RESONANCE-FLUORESCENCE. | | | | | | |
| ---------- | | | | | | |
| $D_2 + O \rightarrow D + OD$ | | | | | | |
| DEUTERIUM MOLECULE + OXYGEN ATOM | | | | | | |
| 75 AFE/APP REACTION ORDER: 2 | 1700-3100 | 4.1(+10) | 1.0 | 8255 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $H_2 + O^*(^1D) \rightarrow H + OH$ | | | | | | |
| HYDROGEN MOLECULE + OXYGEN ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 GAU/SNE REACTION ØRDER: 2 $k/k_{ref}$: 4.0 | 300 | - | - | - | 0.7 | 1.3 |
| NØTE: $k_{ref}$: $Ø_2 + Ø^*(^1D) \rightarrow Ø_2^*(^1\Sigma_g^+) + Ø$ | | | | | | |
| NØTE: EVALUATION | 300 | 1.8(+14) | - | - | | |
| 73 BEI/HUS2 | 300 | 1.6(+14) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 1.23 | 300 | - | - | - | | |
| NØTE: $k_{ref}$: $N_2Ø + Ø^*(^1D) \rightarrow$ products | | | | | | |
| 75 STI/PAY $k/k_{ref}$: 4.23 | 300 | - | - | - | 0.6 | 1.4 |
| NØTE: $k_{ref}$: $Ø_2 + Ø^*(^1D) \rightarrow Ø_2 + Ø(^3P)$ | | | | | | |
| NØTE: EVALUATIØN | 300 | 1.5(+14) | - | - | 0.4 | 1.6 |
| 76 DAV/SAD | 298 | 7.8(+13) | - | - | 0.9 | 1.1 |
| 77 DAV/SCH | 204-352 | 6.0(+13) | 0 | 0 | 0.7 | 1.3 |
| --- | | | | | | |
| $D_2 + Ø^*(^1D) \rightarrow D + ØD$ | | | | | | |
| DEUTERIUM MØLECULE + ØXYGEN ATØM | | | | | | |
| 73 BEI/HUS2 REACTIØN ØRDER: 2 | 300 | 1.1(+14) | - | - | 0.9 | 1.1 |
| 76 DAV/SAD | 298 | 7.8(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $H_2(v=1) + Ø \rightarrow H + ØH$ | | | | | | |
| HYDRØGEN MØLECULE + ØXYGEN ATØM | | | | | | |
| 75 BIR/KAS REACTIØN ØRDER: 2 | 300 | <6.0(+10) | - | - | | |
| NØTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $H_2 + Ø2 \rightarrow ØH + ØH$ | | | | | | |
| HYDRØGEN MØLECULE + ØXYGEN MØLECULE | | | | | | |
| 71 BEL/BRA REACTIØN ØRDER: 2 | 1128-1152 | 1.7(+12) | 0 | 19630 | 0.7 | 1.2 |
| NØTE: EVALUATIØN | | | | | | |
| 75 AZA/ALE | 1076-1523 | 1.9(+14) | 0 | 21900±500 | 0.6 | 1.6 |
| --- | | | | | | |
| $D_2 + Ø2 \rightarrow ØD + ØD$ | | | | | | |
| DEUTERIUM MØLECULE + ØXYGEN MØLECULE | | | | | | |
| 75 AZA/ALE REACTIØN ØRDER: 2 | 843 | 1.0(+3) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $H_2 + D \rightarrow H + DH$ | | | | | | |
| HYDRØGEN MØLECULE + DEUTERIUM ATØM | | | | | | |
| 72 NIK/MAI REACTIØN ØRDER: 2 | 1000 | 3.7(+13) | - | - | 0.9 | 1.1 |
| 73 MIT/LER | 167-346 | 1.6(+7) | 2.0 | 2698±20 | 0.9 | 1.1 |
| 75 AEP/APP | 2600 | 1.5(+13) | - | - | | |
| 76 PEA/RØG1 | 274-1220 | 4.8(+5) | 2.5 | 2490±70 | 0.4 | 2.8 |
| --- | | | | | | |
| $HD + H \rightarrow D + H_2$ | | | | | | |
| DEUTERIUM HYDRIDE + HYDRØGEN ATØM | | | | | | |
| 72 NIK/MAI REACTIØN ØRDER: 2 | 1000 | 1.4(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $HD + D \rightarrow H + D_2$ | | | | | | |
| DEUTERIUM HYDRIDE + DEUTERIUM ATØM | | | | | | |
| 72 NIK/MAI REACTIØN ØRDER: 2 | 1000 | 1.9(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $D_2 + H \rightarrow D + DH$ | | | | | | |
| DEUTERIUM MØLECULE + HYDRØGEN ATØM | | | | | | |
| 72 NIK/MAI REACTIØN ØRDER: 2 | 1000 | 2.8(+13) | - | - | 0.9 | 1.1 |
| 75 AEP/APP | 1860 | 4.0(+12) | - | - | | |
| | 2680 | 9.4(+12) | - | - | | |
| | 2730 | 1.0(+13) | - | - | | |
| 76 PEA/RØG1 | 274-1220 | 2.3(+3) | 3.2 | 2850±90 | 0.3 | 3.4 |
| --- | | | | | | |
| $H_2 + D2 \rightarrow HD + HD$ | | | | | | |
| HYDRØGEN ATØM + DEUTERIUM ATØM | | | | | | |
| 77 LIF/FRE REACTIØN ØRDER: 2 | 1200-1500 | 1.3(+14) | 0 | 19100±2500 | 0.2 | 6.3 |
| NØTE: GIVEN WITH CAUTIØN EVALUATIØN | | | | | | |
| --- | | | | | | |
| $D_2 + H_2 \rightarrow DH + DH$ | | | | | | |
| DEUTERIUM MØLECULE + HYDRØGEN MØLECULE | | | | | | |
| 77 LIF/FRE REACTIØN ØRDER: 2 | 1200-1500 | 1.3(+14) | 0 | 19100±2500 | 0.2 | 6.3 |
| NØTE: GIVEN WITH CAUTIØN EVALUATIØN | | | | | | |
| --- | | | | | | |
| $H_2 + ØH \rightarrow H + H_2Ø$ | | | | | | |
| HYDRØGEN MØLECULE + HYDRØXYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 BRA/BEL1 REACTION ORDER: 2 | 1100-1600 | 2.1(+13) | 0 | 2565±150 | 0.7 | 1.5 |
| 71 ELE/HOY | 500-1500 | 1.0(+13) | 0 | 2415 | | |
| 72 DIX | 1050 | 2.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 72 STU/NIK1 | 298 | 4.3(+9) | - | - | 0.9 | 1.2 |
| 73 DAY/THO | 1050 | 2.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 73 GAR/MAL | 1200-2500 | 5.2(+13) | 0 | 3270 | 0.8 | 1.2 |
| 73 SMI/ZEL2 | 210-460 | 1.4(+13) | 0 | 2420 | | |
| 73 WES/DEH1 | 298-745 | 4.6(+9) | - | - | | |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOR: WITHIN THE GIVEN T RANGE, k INCREASES FROM $4.6\times10^{9}$ TO $4.0\times10^{11}$ $cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 74 GAR/MAL | 300-1800 | 3.2(+7) | 1.77 | 1530 | | |
| NOTE: EVALUATION | | | | | | |
| 74 GAR/MAL | 1350-1600 | 5.2(+13) | 0 | 3250 | | |
| 73 SMI/ZEL | 210-460 | 1.1(+13) | 0 | 2330±120 | 0.7 | 1.5 |
| 75 ATK/HAN1 | 298 | 4.2(+9) | - | - | 0.9 | 1.1 |
| 75 ATK/HAN2 | 297-434 | 3.6(+12) | 0 | 2010±150 | | |
| 75 OVE/PAR | 295 | 3.5(+9) | - | - | 0.9 | 1.1 |
| 75 TRA/ROS | 300 | 3.9(+9) | - | - | | |
| 75 VAN/PEE | 600-1300 | 7.0(+12) | 0 | 2215 | | |
| $H_2 + OH \rightarrow H + H_2O$ | | | | | | |
| HYDROGEN MOLECULE + HYDROXYL FREE RADICAL | | | | | | |
| 76 BRA/CAP REACTION ORDER: 2 $k/k_{ref}$: 0.59 | 1300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_4 + OH \rightarrow CH_3\cdot + H_2O$ | | | | | | |
| --- | | | | | | |
| $HD + OH(v=1) \rightarrow H + H_2O$ | | | | | | |
| HYDROGEN MOLECULE + HYDROXYL FREE RADICAL | | | | | | |
| 77 SFE/END REACTION ORDER: 2 | 295 | <6.0(+9) | - | - | | |
| NOTE: $OH^{\ddagger}(v=1)$ STATE UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $HD + OH \rightarrow H + HDO$ | | | | | | |
| DEUTERIUM HYDRIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 DIX REACTION ORDER: 2 | 1050 | 9.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 73 DAY/THO REACTION ORDER: 2 | 1050 | 9.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $D_2 + OH \rightarrow D + DHO$ | | | | | | |
| DEUTERIUM MOLECULE + HYDROXYL FREE RADICAL | | | | | | |
| 72 STU/NIK1 REACTION ORDER: 2 | 298 | 1.2(+9) | - | - | 0.9 | 1.2 |
| 74 SMI/ZEL | 210-460 | 7.5(+12) | 0 | 2590±180 | 0.7 | 1.5 |
| --- | | | | | | |
| $D_2 + OD \rightarrow D_2O + D$ | | | | | | |
| DEUTERIUM MOLECULE + HYDROXYL-D FREE RADICAL | | | | | | |
| 75 APP/APP REACTION ORDER: 2 | 1700-3100 | 6.6(+13) | 0 | 2592 | 0.3 | 3.0 |
| --- | | | | | | |
| $H_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| HYDROGEN MOLECULE + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.22 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $H_2 + N^*(^2D) \rightarrow$ products | | | | | | |
| HYDROGEN MOLECULE + NITROGEN ATOM | | | | | | |
| 72 HUS/KIR2 REACTION ORDER: 2 | 300 | 1.0(+12) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| $H_2 + NO \rightarrow H + HNO$ | | | | | | |
| HYDROGEN MOLECULE + NITROGEN OXIDE (NO) | | | | | | |
| 75 KOS/AND REACTION ORDER: 2 | 2000-4000 | 4.0(+13) | 0 | 29040 | | |
| 76 AND/ASA | 2300-3500 | 3.2(+13) | 0 | 27780 | 0.7 | 1.4 |
| NOTE: REEVALUATION | | | | | | |
| --- | | | | | | |
| $H_2 + C^* \rightarrow H + CH$ | | | | | | |
| HYDROGEN MOLECULE + CARBON ATOM | | | | | | |
| 71 HUS/KIR1 REACTION ORDER: 2 | 300 | 1.6(+14) | - | - | 0.9 | 1.1 |
| NOTE: $C^*(2\,^1D_2)$STATE | | | | | | |
| --- | | | | | | |
| $H_2 + C(^3P) + M \rightarrow$ products | | | | | | |
| HYDROGEN MOLECULE + CARBON ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in $^{o}K$) | k factors f | F |
|---|---|---|---|---|---|---|
| 75 HUS/YOU REACTION ORDER: 3 M: He | 300 | 2.5(+16) | - | - | 0.8 | 1.2 |
| $H_2 + CH \rightarrow$ products | | | | | | |
| HYDROGEN MOLECULE + METHYLIDYNE FREE RADICAL<br>71 BOS/PER REACTION ORDER: 2 | 298 | 1.05(+13) | - | - | 0.9 | 1.1 |
| $H_2 + {}^1CH_2^* \rightarrow H + CH_3$ | | | | | | |
| HYDROGEN MOLECULE + METHYLENE FREE RADICAL<br>77 PIL/ROB REACTION ORDER: 2 | 298 | 1.2(+13) | - | - | | |
| NOTE: ${}^1CH_2^*({}^1B_1)$ STATE | | | | | | |
| $H_2 + {}^3CH_2 \rightarrow H + CH_3$ | | | | | | |
| HYDROGEN MOLECULE + METHYLENE FREE RADICAL<br>77 PIL/ROB REACTION ORDER: 2 | 298 | 3.0(+9) | - | - | | |
| NOTE: ${}^3CH_2$ (GROUND STATE); UPPER LIMIT k | | | | | | |
| $H_2 + CH_3 \rightarrow H + CH_4$ | | | | | | |
| HYDROGEN MOLECULE + METHYL FREE RADICAL<br>72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $D_2 + CH_3\cdot \rightarrow D + CH_3D$; $k/k_{ref}$: 0.911 EXP(+688/T) | | | | | | |
| 73 CLA/DOV2 REACTION ORDER: 2 | 1200-2000 | 1.5(+13) | 0 | 7800 | 0.5 | 2.0 |
| NOTE: EVALUATION BASED ON AN EXPERIMENTAL<br>$k = (4.6 \times 1.4) \times 10^{10} cm^3 mol^{-1} s^{-1}$ AT 1 | | | | | | |
| 74 KOB/PAC | 372-1370 | 7.9(+5) | 2.0 | 4810 | | |
| $H_2 + CH_3^* \rightarrow H + CH_4$ | | | | | | |
| HYDROGEN MOLECULE + METHYL FREE RADICAL<br>73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 0.75 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_3Br + CH_3^* \rightarrow \cdot CH_2Br + CH_4$ | | | | | | |
| $H_2 + CD_3 \rightarrow H + CD_3H$ | | | | | | |
| HYDROGEN MOLECULE + METHYL-$d_3$ FREE RADICAL<br>72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $D_2 + CD_3 \rightarrow D + CD_4$ ($k/k_{ref}$: 1.592 exp (+296/T) | | | | | | |
| $H_2 + CD_3^*\cdot \rightarrow H + CD_3H$ | | | | | | |
| HYDROGEN MOLECULE + METHYL-$d_3$ FREE RADICAL<br>73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 0.093 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CD_3Br + CD_3^*\cdot \rightarrow CD_2Br + CD_4$<br>GIVEN IN PAPER: $k_{ref}/k = 10.8 \pm 0.7$ | | | | | | |
| $DH + CH_3 \rightarrow D + CH_4$ | | | | | | |
| DEUTERIUM HYDRIDE + METHYL FREE RADICAL<br>72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $HD + CH_3\cdot \rightarrow CH_3D + H$;<br>$k/k_{ref}$: 0.283 exp(+970/T) | | | | | | |
| $DH + CD_3 \rightarrow D + CD_3H$ | | | | | | |
| DEUTERIUM HYDRIDE + METHYL-$d_3$ FREE RADICAL<br>72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $HD + CD_3 \rightarrow H + CD_4$; $k/k_{ref}$: 0.932(+275/T) | | | | | | |
| $D_2 + CH_3 \rightarrow D + CH_3D$ | | | | | | |
| DEUTERIUM MOLECULE + METHYL FREE RADICAL<br>77 YAN REACTION ORDER: 2 $k/k_{ref}$: 0.34 | 1260-1390 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + CH_3 \rightarrow \cdot CH_2CH{=}CH_2 + CH_3$<br>76 PEA/ROG2 | 300-1118 | 1.6(+12) | 0 | 6370±40 | | |
| $D_2 + CH_3^* \rightarrow D + CH_3D$ | | | | | | |
| DEUTERIUM MOLECULE + METHYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 0.05 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3Br + CH_3^* \rightarrow .CH_3Br + CH_4$ | | | | | | |
| ---------- | | | | | | |
| $D_2 + CD_3^* \rightarrow D + CD_4$ | | | | | | |
| DEUTERIUM MOLECULE + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 2.15 | 298 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $H_2 + CD_3^* \rightarrow H + CD_3H$ | | | | | | |
| ---------- | | | | | | |
| $H_2 + CN \rightarrow H + HCN$ | | | | | | |
| HYDROGEN MOLECULE + CYANOGEN FREE RADICAL | | | | | | |
| 74 SCH/SCH REACTION ORDER: 2 | 298-388 | 6.3(+13) | - | 2670 | | |
| 75 AIB/HOY | 718-1111 | 6.0(+13) | 0 | 2670±300 | 0.7 | 1.3 |
| 77 SCH/WAG | 259-396 | 6.0(+13) | 0 | 2670±300 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $H_2 + CH{\equiv}C. \rightarrow H + CH{\equiv}CH$ | | | | | | |
| HYDROGEN MOLECULE + ETHYNYL FREE RADICAL | | | | | | |
| 74 YAN/LAV REACTION ORDER: 2 | 1063-1233 | 6.0(+12) | 0 | 3270 | 0.4 | 2.5 |
| NOTE: $k_1 = k_{-1}$ | | | | | | |
| ---------- | | | | | | |
| $D_2 + CH{\equiv}CH \rightarrow CHD{=}CHD$ | | | | | | |
| DEUTERIUM MOLECULE + ETHYNE | | | | | | |
| 77 OGU2 REACTION ORDER: 2 | 1000-1600 | 4.9(+11) | 0 | 17565±300 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $H_2 + CH_3CH_2. \rightarrow H + CH_3CH_3$ | | | | | | |
| HYDROGEN MOLECULE + ETHYL FREE RADICAL | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713 | 2.2(+8) | - | - | | |
| ---------- | | | | | | |
| $D_2 + CH_3CH_2. \rightarrow D + CH_3CH_2D$ | | | | | | |
| DEUTERIUM MOLECULE + ETHYL FREE RADICAL | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713 | 8.3(+7) | - | - | | |
| ---------- | | | | | | |
| $H_2 + (CH_3)_2CH. \rightarrow H + CH_3CH_2CH_3$ | | | | | | |
| HYDROGEN MOLECULE + ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 76 EAL/CLE REACTION ORDER: 2 $k/k_{ref}$: 2.15 | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $D_2 + (CH_3)_2CH. \rightarrow D + CH_3CHDCH_3$ | | | | | | |
| $H_2 + M \rightarrow H + H + M$ | | | | | | |
| HYDROGEN MOLECULE | | | | | | |
| 73 BRE/BIR REACTION ORDER: 2 M: H | 3500-8000 | 2.1(+15) | 0 | 43885 | | |
| M: $H_2$ | 3500-8000 | 3.3(+15) | 0 | 53000 | | |
| M: Ar | 3500-8000 | 9.4(+13) | 0 | 44740 | | |
| M: Xe | 3500-8000 | 9.4(+13) | 0 | 44740 | | |
| ---------- | | | | | | |
| $D_2 + M \rightarrow D + D + M$ | | | | | | |
| DEUTERIUM MOLECULE | | | | | | |
| 75 AFP/APP REACTION ORDER: 2 | 1800-4000 | 1.4(+14) | 0 | 47000 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $OH + O \rightarrow H + O_2$ | | | | | | |
| HYDROXYL FREE RADICAL + OXYGEN ATOM | | | | | | |
| 77 CAM/HAN REACTION ORDER: 2 $k/k_{ref}$: 260. | 425 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $OH + CO \rightarrow H + CO_2$ | | | | | | |
| 77 CAM/HAN | 425 | 2.7(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH(v=1) + O \rightarrow H + O_2$ | | | | | | |
| HYDROXYL FREE RADICAL + OXYGEN ATOM | | | | | | |
| 77 SPE/END REACTION ORDER: 2 | 295 | 5.4(+13) | - | - | 0.7 | 1.3 |
| 77 SPE/GLA | 295 | 6.3(+13) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |
| $OH^{\ddagger}(v=9) + O \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + OXYGEN ATOM | | | | | | |
| 76 KRI REACTION ORDER: 2 | 298 | 1.8(+13) | - | - | | |
| ---------- | | | | | | |
| $OH + O_3 \rightarrow HO_2 + O_2$ | | | | | | |
| HYDROXYL FREE RADICAL + OZONE | | | | | | |
| 73 AND/KAU2 REACTION ORDER: 2 | 220-450 | 7.8(+11) | 0 | 956 | | |
| 73 DEM | 300 | 4.8(+10) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 KIT | 298 | 3.9(+10) | - | - | 0.8 | 1.2 |
| 74 SIM/HEI1 | 298 | 9.0(+9) | - | - | | |
| NOTE: LOWER LIMIT k EVALUATION | 298 | 3.0(+10) | - | - | 0.4 | 1.6 |
| NOTE: EVALUATION | 271-333 | - | - | - | | |
| 75 DEM REACTION ORDER: 2 | | | | | | |
| NOTE: $k_{ref}$: OH + CO → H + $CO_2$; $k/k_{ref}$: 16.8 exp (-1233/T) | 271-333 | 1.5(+12) | 0 | 1233 | | |
| 75 DEM | | | | | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| OD(v=n) + $O_3$ → $DO_2$ + $O_2$ | | | | | | |
| HYDROXYL-D FREE RADICAL + OZONE | | | | | | |
| 74 EAS/BRA REACTION ORDER: 2 | 298 | 3.3(+12) | - | - | 0.8 | 1.2 |
| NOTE: UNREPORTED T, ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| OH(v=2) + $O_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + OZONE | | | | | | |
| 71 COL/WOK REACTION ORDER: 2 | 298 | 1.1(+12) | - | - | 0.4 | 1.6 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K. | | | | | | |
| k INCREASING TO $4.6 \times 10^{12} cm^3 mol^{-1} s^{-1}$ FROM v=2 TO v=9 | | | | | | |
| --- | | | | | | |
| OH(v=4) + $O_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + OZONE | | | | | | |
| 76 STR/JOH REACTION ORDER: 2 | 300 | 2.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: k INCREASING TO $6.6 \times 10^{12} cm^3 mol^{-1} s^{-1}$ FOR OH(v=9) | | | | | | |
| --- | | | | | | |
| OH(v=9) + $O_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + OZONE | | | | | | |
| 71 PET/COL REACTION ORDER: 2 | 298 | 4.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| OH + H → $H_2O$ | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 77 ZEL/ERL REACTION ORDER: 2 | 230-300 | 1.6(+10) | 0 | 0 | 0.8 | 1.2 |
| --- | | | | | | |
| OH + H + M → $H_2O$ + M | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 71 GAY/PRA REACTION ORDER: 3 M: Ar | 1900 | 2.7(+15) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: Ar(1.0) | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 1650 | 1.0(+16) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: $N_2$(4.0) | | | | | | |
| M: $H_2O$ | 1900 | 4.9(+16) | - | - | 0.7 | 1.3 |
| NOTE: MEAN T. M eff: $H_2O$( 18.0) | | | | | | |
| 72 FRI/SUT REACTION ORDER: 2 | 2130 | 4.4(+10) | - | - | | |
| NOTE: RATE CONSTANT EXPRESSED AS: $k[M] = 4.4 \times 10^{10} cm^3 mol^{-1} s^{-1}$ | | | | | | |
| M = $O_2$,$N_2$,$H_2O$ | | | | | | |
| 77 ZEL/ERL REACTION ORDER: 3 M: He | 230-300 | 1.6(+23) | -2.6 | 0 | 0.3 | 1.7 |
| M: He | 300 | 5.4(+16) | - | - | 0.7 | 1.3 |
| NOTE:M eff: He(1.0) | | | | | | |
| 77 ZEL/ERL M: Ar | 300 | 8.2(+16) | - | - | 0.7 | 1.3 |
| NOTE:M eff: Ar(1.5) | | | | | | |
| 77 ZEL/ERL M: $N_2$ | 300 | 1.7(+17) | - | - | 0.7 | 1.3 |
| NOTE:M eff: $N_2$(3.2 + 0.3) | | | | | | |
| 77 ZEL/ERL M: $CO_2$ | 300 | 3.3(+17) | - | - | 0.7 | 1.3 |
| NOTE:M eff: $CO_2$(6 + 1) | | | | | | |
| --- | | | | | | |
| OH + H + M → $H_2O$ + M* | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 74 DAV/MCG REACTION ORDER: 3 M: OH | 1740-1860 | 8.3(+15) | 0 | 0 | 0.6 | 1.4 |
| --- | | | | | | |
| OH + $H_2$ → $H_2O$ + H | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 71 BRA/BEL1 REACTION ORDER: 2 | 1100-1600 | 2.1(+13) | 0 | 2565±150 | 0.7 | 1.5 |
| 71 EBE/HOY | 500-1500 | 1.0(+13) | 0 | 2415 | | |
| 72 DIX | 1050 | 2.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | 298 | 4.3(+9) | - | - | 0.9 | 1.2 |
| 72 STU/NIK1 | 1050 | 2.7(+12) | - | - | 0.9 | 1.1 |
| 73 DAY/THO | | | | | | |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 GAR/MAL | 1200-2500 | 5.2(+13) | 0 | 3270 | 0.8 | 1.2 |
| 73 SMI/ZEL2 | 210-460 | 1.4(+13) | 0 | 2420 | | |
| 73 WES/DEH1 | 298-745 | 4.6(+9) | - | - | | |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOR; WITHIN THE GIVEN T RANGE, k INCREASES FROM $4.6\times10^{9}$ TO $4.0\times10^{11}$ $cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 74 GAR/MAL | 1350-1600 | 5.2(+13) | 0 | 3250 | | |
| NOTE: EVALUATION | 300-1800 | 3.2(+7) | 1.77 | 1530 | | |
| 74 SMI/ZEL | 210-460 | 1.1(+13) | 0 | 2330±120 | 0.7 | 1.5 |
| 75 ATK/HAN1 | 298 | 4.2(+9) | - | - | 0.9 | 1.1 |
| 75 ATK/HAN2 | 297-434 | 3.6(+12) | 0 | 2010±150 | | |
| $OH + H_2 \rightarrow H_2O + H$ | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 75 EVE/PAR | 295 | 3.5(+9) | - | - | 0.9 | 1.1 |
| 75 TRA/ROS | 300 | 3.9(+9) | - | - | | |
| 75 VAN/PEE | 600-1300 | 7.0(+12) | 0 | 2215 | | |
| 76 BRA/CAP | 1300 | - | - | - | | |
| $k/k_{ref}$: 0.59 | | | | | | |
| NOTE: $k_{ref}$: $OH + CH_4 \rightarrow H_2O + CH_3\cdot$ | | | | | | |
| --- | | | | | | |
| $OH + HD \rightarrow HDO + H$ | | | | | | |
| HYDROXYL FREE RADICAL + DEUTERIUM HYDRIDE | | | | | | |
| REACTION ORDER: 2 | | | | | | |
| 72 DIX | 1050 | 9.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 73 DAY/THO | 1050 | 9.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $OH + D_2 \rightarrow DHO + D$ | | | | | | |
| HYDROXYL FREE RADICAL + DEUTERIUM MOLECULE | | | | | | |
| REACTION ORDER: 2 | | | | | | |
| 72 STU/NIK1 | 298 | 1.2(+9) | - | - | 0.9 | 1.2 |
| 74 SMI/ZEL | 210-460 | 7.5(+12) | 0 | 2590±180 | 0.7 | 1.5 |
| --- | | | | | | |
| $OD + D_2 \rightarrow D + D_2O$ | | | | | | |
| HYDROXYL-D FREE RADICAL + DEUTERIUM MOLECULE | | | | | | |
| REACTION ORDER: 2 | | | | | | |
| 75 AFP/APP | 1700-3100 | 6.6(+13) | 0 | 2592 | 0.3 | 3.0 |
| --- | | | | | | |
| $OH^{\ddagger} + H_2 \rightarrow H_2O + H$ | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| REACTION ORDER: 2 | | | | | | |
| 76 SHE/END | 295 | <6.0(+9) | - | - | | |
| NOTE: $OH^{\ddagger}$(v=1) STATE. UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $OH + OH \rightarrow H_2O + O$ | | | | | | |
| HYDROXYL FREE RADICAL | | | | | | |
| REACTION ORDER: 2 | | | | | | |
| 73 GAR/MAL | 1200-2500 | 5.5(+13) | 0 | 3525 | 0.8 | 1.2 |
| 73 MCK/MUL | 298 | 1.3(+12) | - | - | 0.8 | 1.2 |
| 73 WES/DEH2 | 298 | 1.4(+12) | - | - | 0.9 | 1.1 |
| 74 CIY/DOW | 300 | 8.4(+11) | - | - | 0.9 | 1.1 |
| 74 CIY/DOW | 300 | 1.0(+12) | - | - | 0.6 | 1.4 |
| NOTE: SUGGESTED k | | | | | | |
| 74 KAW/GAR | 1200-2000 | 5.5(+13) | 0 | 3490 | | |
| NOTE: REEVALUATION | | | | | | |
| NOTE: REEVALUATION (ALTERNATE EXPRESSION) | 1200-2000 | 2.1(+9) | 1.11 | 0 | | |
| 74 KAW/GAR | | | | | | |
| NOTE: REEVALUATION (ALTERNATE EXPRESSION) | 1200-2000 | 1.7(+6) | 2.03 | -600 | | |
| 74 TRA/ROS1 | 298 | 1.3(+12) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $OH + OH + M \rightarrow H_2O2 + M$ | | | | | | |
| 74 TRA/ROS | 298 | 9.1(+16) | - | - | 0.9 | 1.1 |
| REACTION ORDER: 3 M: $N_2$ | | | | | | |
| --- | | | | | | |
| $OH + HO_2 \rightarrow H_2O + O_2$ | | | | | | |
| HYDROXYL FREE RADICAL + HYDROPEROXYL FREE RADICAL | | | | | | |
| REACTION ORDER: 2 | | | | | | |
| 72 CAS/SCH | 2130 | 1.2(+13) | - | - | | |
| 72 DAY/DIX | 300-1800 | - | - | - | | |
| $k/k_{ref}$: ≤5.5 | | | | | | |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow H_2 + O_2$ (UPPER LIMIT RATIO) | | | | | | |
| 72 HOC/GHO | 298 | 1.2(+14) | - | - | 0.8 | 1.2 |
| 73 DAY/THO | 300-1050 | - | - | - | | |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow H_2 + O_2$ (UPPER LIMIT RATIO) | | | | | | |
| 73 PEE/MAH1 | 1600 | 5.0(+13) | - | - | | |
| NOTE: TENTATIVE k | | | | | | |
| 74 DEM/TSC | 298 | 9.6(+13) | - | - | 0.3 | 3.0 |
| 75 HAC/ROY | 298-670 | <2.0(+13) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 BER/HAR | 293 | 3.1(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $OH(v=9) + H_2O \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + WATER | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | >1.2(+11) | - | - | 0.2 | 1.8 |
| NOTE: LOWER LIMIT k. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $OH + H_2O_2 \rightarrow H_2O + HO_2$ | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN PEROXIDE | | | | | | |
| 72 GER/VOL REACTION ORDER: 2 | 298 | 7.2(+11) | - | - | 0.7 | 1.3 |
| 74 HAC/HOY2 | 298-669 | 4.8(+12) | 0 | 670±70 | 0.8 | 1.2 |
| 75 HAC/HOY | 298-670 | 4.8(+12) | 0 | 670±70 | 0.8 | 1.2 |
| 75 MEA/HEI $k/k_{ref}$: 4.1 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $OH + CO \rightarrow H + CO_2$ | | | | | | |
| 76 GOR | 298 | 7.5(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $OH(v=9) + SO_2 \rightarrow HOSO2$ | | | | | | |
| HYDROXYL FREE RADICAL + SULFUR DIOXIDE | | | | | | |
| 72 WEP/COL REACTION ORDER: 2 | 298 | >1.4(+10) | - | - | 0.8 | 1.2 |
| NOTE: LOWER LIMIT k[ UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $OH + SO_2 + M \rightarrow HOSO_2 + M$ | | | | | | |
| HYDROXYL FREE RADICAL + SULFUR DIOXIDE | | | | | | |
| 74 COX2 REACTION ORDER: 2 | 294 | 3.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION; RATECONSTANT EXPRESSED AS k[M] | | | | | | |
| WITH $M=N_2 + O_2$ at 1 ATM | | | | | | |
| 75 CAS/DAV M: $N_2$ | 298 | 3.6(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k (760 TORR) | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 298 | 5.8(+16) | - | - | | |
| NOTE: k (LOW PRESSURE : <20 TORR) | | | | | | |
| 75 GOK/MUL1 REACTION ORDER: 2 M: He | 435 | 1.1(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 HAR/WAY REACTION ORDER: 3 M: Ar | 298 | 1.6(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 298 | 2.6(+17) | - | - | 0.6 | 1.4 |
| 76 ATK/PER3 REACTION ORDER: 2 | 298 | 4.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: AT 760 TORR | 298 | 5.0(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 | 298 | 5.9(+16) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| 77 CAS/TAN REACTION ORDER: 2 | 297 | 3.6(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE K(760 TORR) | | | | | | |
| REACTION ORDER: 3 | 297 | 5.8(+16) | - | - | | |
| NOTE: $k_0$ (LOW PRESSURE) | 253-297 | 5.0(+14) | 0 | -1410 | | |
| NOTE: k (LOW PRESSURE) ON THE BASIS OF k (297) AND EA EXPERIMENTAL VALUES | 253-297 | 2.5(+29) | -5.1 | 0 | | |
| NOTE: k (LOW PRESSURE). ALTERNATIVE T-DEPENDENT EXPRESSION | | | | | | |
| ---------- | | | | | | |
| $OH + H_2S \rightarrow H_2O + SH$ | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN SULFIDE | | | | | | |
| 73 WIS/DEH3 REACTION ORDER: 2 | 298-885 | 1.4(+13) | 0 | 443 | | |
| 74 STU | 298 | 1.8(+12) | - | - | 0.8 | 1.2 |
| 76 PER/ATK1 | 297-427 | 3.1(+12) | 0 | 0 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $OH + H_2S \rightarrow$ products (OVERALL) | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN SULFIDE | | | | | | |
| 72 NIK/MOR1 REACTION ORDER: 2 | 300 | 5.2(+12) | - | - | | |
| NOTE: APPROXIMATE k | | | | | | |
| ---------- | | | | | | |
| $OH(v=9) + H_2S \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + HYDROGEN SULFIDE | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | >1.5(+11) | - | - | 0.6 | 1.4 |
| NOTE: LOWER LIMIT k[ UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $OH + N_2 \rightarrow H + N_2O$ | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN MOLECULE | | | | | | |
| 75 AID/HOY REACTION ORDER: 2 | 700-1100 | 3.2(+12) | 0 | 40510 | | |
| NOTE: EVALUATION BASED ON $k_{-1}$ AND THERMODYNAMIC DATA | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| OH(v=9) + $N_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN MOLECULE | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 2.2(+9) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| OH(v=9) + NO → HONO | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 9.0(+10) | - | - | 0.8 | 1.2 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| OH + NO + M → HONO + M | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 72 AND/KAU REACTION ORDER: 3 M: Ar | 297 | 1.5(+17) | - | - | 0.5 | 1.5 |
| NOTE: AT 5 TORR | 297 | 9.1(+16) | - | - | 0.6 | 1.4 |
| 72 AND/KAU | | | | | | |
| NOTE: AT 6 TORR | 300-416 | 1.0(+16) | 0 | -810±240 | 0.8 | 1.2 |
| 72 MCK/SMI | | | | | | |
| NOTE: k (LOW PRESSURE) | | | | | | |
| 72 STU/NIK2 REACTION ORDER: 2 M: He | 300 | 1.2(+12) | - | - | 0.5 | 1.5 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 72 WES/DEH4 REACTION ORDER: 3 M: He | 273-395 | 4.7(+17) | - | - | | |
| NOTE: k DECREASING WITHIN GIVEN T RANGE FROM $4.7 \times 10^{17}$ TO | | | | | | |
| $1.3 \times 10^{17}$ $cm^6 mol^{-1} s^{-1}$ | | | | | | |
| 72 WES/DEH4 M: Ar | 298 | 1.3(+17) | - | - | | |
| OH + NO + M → HONO + M | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 74 AND/MAR M: He | 295 | 1.2(+17) | - | - | 0.8 | 1.2 |
| NOTE: A NEGATIVE ACTIVATION ENERGY OF -1700±300 cal/mol | | | | | | |
| (OR E/R=-856±150) WAS DETERMINED | | | | | | |
| IN THE RANGE 295-439K | | | | | | |
| M: Ar | 295 | 1.2(+17) | - | - | 0.8 | 1.2 |
| M: $N_2$ | 295 | 2.1(+17) | - | - | 0.8 | 1.2 |
| 74 AND/MAR | | | | | | |
| 74 CEX2 REACTION ORDER: 2 | 294 | 3.7(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION; RATECONSTANT EXPRESSED AS k[M] | | | | | | |
| WITH M=$N_2$ + $O_2$ AT 1 ATM | | | | | | |
| 74 HOW/EVE REACTION ORDER: 3 M: He | 296 | 1.5(+17) | - | - | | |
| M: Ar | 296 | 1.6(+17) | - | - | | |
| M: $N_2$ | 296 | 2.8(+17) | - | - | | |
| 74 HOW/EVE | | | | | | |
| 75 ATK/HAN1 REACTION ORDER: 2 M: Ar | 298 | 3.1(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k REACTION ORDER: 3 M: Ar | 298 | 1.5(+17) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k REACTION ORDER: 2 M: $N_2$ | 298 | 3.7(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k REACTION ORDER: 3 M: $N_2$ | 298 | 2.2(+17) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k | | | | | | |
| 75 GOP/MUL1 M: $H_2O$ | 435 | 4.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 HAR/WAY REACTION ORDER: 3 M: Ar | 298 | 2.5(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 298 | 5.4(+17) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| 76 COX/DER1 REACTION ORDER: 2 $k/k_{ref}$: 1630 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H M=$N_2$ + $O_2$ | 298 | 7.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION; M=$N_2$ + $O_2$ | 295 | 1.1(+13) | - | - | | |
| 76 OVE/PAR | | | | | | |
| NOTE: LIMITING HIGH PRESSURE k; M=$H_2O$,$CF_4$,$SF_6$,$N_2$,Ar, OR He | | | | | | |
| M: He | 295 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 777 TORR M: Ar | 295 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 770 TORR M: $SF_6$ | 295 | 7.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 770 TORR M: $N_2$ | 295 | 4.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 770 TORR M: $CF_4$ | 295 | 8.4(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 710 TORR M: $H_2$ | 298 | - | - | - | 0.9 | 1.1 |
| 76 SIE/SIM2 | | | | | | |
| NOTE: $k_{ref}$: OH + CO → H + $CO_2$ (CONSTANT RATIO FOR 408-768 TORR PRESSURE RANGE, DECREASING TO 16.1 AT 96 TORR) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 SIE/SIM2 M: $H_2$ | 298 | 7.2(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION) | | | | | | |
| 76 SIM/HEI M: $H_2$ | 296 | 2.2(+12) | - | - | | |
| NOTE: AT ~100 TORR (EVALUATION) | | | | | | |
| M: $H_2$ | 296 | 6.6(+12) | - | - | | |
| NOTE: AT 730 TORR (EVALUATION) | | | | | | |
| ---------- | | | | | | |
| $OH + NO_2 + M \rightarrow HONO_2 + M$ | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE (NO2) | | | | | | |
| 72 AND/KAU REACTION ORDER: 3 M: Ar | 297 | 3.6(+17) | - | - | 0.7 | 1.3 |
| REACTION ORDER: 3 M: $N_2$ | 297 | 7.3(+17) | - | - | 0.7 | 1.3 |
| 72 SIM/EEI2 REACTION ORDER: 2 M: $H_2O$ | 300-423 | 6.3(+12) | 0 | 170 | | |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION) | | | | | | |
| REACTION ORDER: 3 M: $H_2O$ | 300-423 | 4.0(+18) | 0 | 0 | | |
| NOTE: TEMPERATURE INDEPENDENT k (EVALUATION) | | | | | | |
| 72 WES/DEH4 M: Ar | 298 | 3.0(+17) | - | - | | |
| 72 WES/DEH4 | 273-395 | 7.3(+17) | - | - | | |
| NOTE: k DECREASING WITHIN GIVEN T RANGE FROM $7.3 \times 10^{17}$ TO $2.1 \times 10^{17}$ $cm^6 mol^{-1} s^{-1}$ | | | | | | |
| 74 AND/MAR M: He | 295 | 3.6(+17) | - | - | 0.8 | 1.2 |
| M: Ar | 295 | 3.6(+17) | - | - | 0.8 | 1.2 |
| NOTE: A NEGATIVE ACTIVATION ENERGY OF -1800±300 cal/mol WAS DETERMINED IN THE RANGE 295-439K | | | | | | |
| M: $N_2$ | 295 | 8.3(+17) | - | - | 0.8 | 1.2 |
| 74 GLA/TRO1 M: He | 295-1200 | 1.4(+25) | -2.98 | 0 | 0.6 | 1.6 |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$) | | | | | | |
| CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[He] | | | | | | |
| REACTION ORDER: 2 M: Ar | 295-1200 | 4.0(+14) | -0.85 | 0 | 0.6 | 1.6 |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$) | | | | | | |
| REACTION ORDER: 3 M: Ar | 295-1200 | 5.6(+24) | -2.9 | 0 | 0.6 | 1.6 |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$) | | | | | | |
| CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[Ar] | | | | | | |
| M: $N_2$ | 622 | 3.0(+17) | - | - | | |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 K_{k-1}$) | | | | | | |
| CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[$N_2$] | | | | | | |
| M: $N_2$ | 670 | 1.7(+17) | - | - | | |
| NOTE: LIMITING LOW PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$ | | | | | | |
| CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[$N_2$] | | | | | | |
| 74 HOW/EVE M: $N_2$ | 296 | 1.1(+18) | - | - | | |
| 75 GER/MUL1 M: $N_2$ | 435 | 3.2(+12) | - | - | | |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 HAR/WAY REACTION ORDER: 3 M: Ar | 298 | 5.4(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 298 | 9.4(+17) | - | - | 0.6 | 1.4 |
| 76 ANA/SMI M: $O_2$ | 296 | 6.5(+17) | - | - | | |
| NOTE: M eff: $O_2$(0.68). LIMITING LOW PRESSURE k | | | | | | |
| M: Ar | 296 | 4.0(+17) | - | - | | |
| NOTE: M eff: Ar(0.42). LIMITING LOW-PRESSURE k | | | | | | |
| M: He | 296 | 3.3(+17) | - | - | | |
| NOTE: M eff: He(0.34). LIMITING LOW-PRESSURE k | | | | | | |
| M: $N_2$ | 296 | 9.8(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 296 | 9.6(+17) | - | - | | |
| NOTE: M eff: $N_2$(1.0). LIMITING LOW-PRESSURE k | | | | | | |
| M: $N_2$ | 220-550 | 5.5(+16) | 0 | -818 | 0.8 | 1.2 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| M: $N_2$ | 220-550 | 2.6(+24) | -2.6 | 0 | 0.8 | 1.2 |
| NOTE: LIMITING LOW-PRESSURE k (ALTERNATE T-DEPENDENT EXPRESSION) | | | | | | |
| M: $SF_6$ | 296 | 2.4(+18) | - | - | | |
| NOTE: M eff: $SF_6$(2.5). LIMITING LOW-PRESSURE k | | | | | | |
| 76 ATK/PER3 M: Ar | 298 | 3.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 760 TORR | | | | | | |
| M: Ar | 298 | 3.7(+17) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| REACTION ORDER: 2 M: $N_2$ | 298 | 3.9(+12) | - | - | 0.8 | 1.2 |
| NOTE: AT 760 TORR | 298 | 5.1(+12) | - | - | | |
| NOTE: M=Ar, OF $N_2$. LIMITING HIGH-PRESSURE k | | | | | | |
| 77 ERL/FIE REACTION ORDER: 3 M: He | 213-300 | 5.4(+24) | -2.9 | 0 | 0.7 | 1.3 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| 77 ERL/FIE M: He | 300 | 3.6(+17) | - | - | 0.6 | 1.4 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| 77 ERL/FIE M: $CO_2$ | 300 | 1.5(+18) | - | - | 0.9 | 1.1 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| --- | | | | | | |
| $OH + N_2O \rightarrow HO_2 + N_2$ | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 76 BIE/ZET REACTION ORDER: 2 | 298 | 2.3(+7) | - | - | 0.7 | 1.3 |
| 77 CHA/KAU | 480 | <2.4(+8) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $OH(v=9) + N_2O \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 72 WOR/COL REACTION ORDER: 2 | 298 | 2.9(+10) | - | - | 0.5 | 1.5 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $OH + N_2O + M \rightarrow HO_2 + N_2 + M$ | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 440 | <1.0(+10) | - | - | | |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR. UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $OH + N_2O + M \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 76 ATK/PER REACTION ORDER: 2 | 298-443 | <1.2(+8) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k (UPPER LIMIT); (25-654 TORR) | | | | | | |
| --- | | | | | | |
| $OH + NH_3 \rightarrow H_2O + NH_2$ | | | | | | |
| HYDROXYL FREE RADICAL + AMMONIA | | | | | | |
| 73 GER/HOY REACTION ORDER: 2 | 298 | 1.7(+11) | - | - | | |
| 73 KUK | 298 | 2.5(+10) | - | - | 0.9 | 1.1 |
| 73 STU3 | 298 | 9.0(+10) | - | - | 0.7 | 1.3 |
| 74 DOV/NIP | 1620-192' | <8.0(+9) | 0.68 | 554 | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 74 ZEL/SMI | 230-490 | 1.4(+12) | 0 | 805 | 0.9 | 1.1 |
| 74 HAC/HOY1 | 298-669 | 3.2(+12) | 0 | 920 | 0.8 | 1.2 |
| 75 COX/DER2 | 296 | 7.2(+10) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| 75 SMI/ZEL | 228-472 | 1.4(+12) | 0 | 805 | 0.9 | 1.1 |
| 76 PER/ATK1 | 297-427 | 1.8(+12) | 0 | 860±150 | | |
| $OH + NH_3 + M \rightarrow H_2O + NH_2 + M$ | | | | | | |
| HYDROXYL FREE RADICAL + AMMONIA | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 418 | 2.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $OH + HNO \rightarrow H_2O + NO$ | | | | | | |
| HYDROXYL FREE RADICAL + NITROSYL HYDRIDE | | | | | | |
| 72 SMI REACTION ORDER: 2 | 2100 | 1.1(+13) | - | - | 0.9 | 1.1 |
| 75 CAM/HAN2 $k/k_{ref}$: ≤4.4 | 425 | - | - | - | | |
| NOTE: $k_{ref}$: $O + HNO \rightarrow OH + NO$ UPPER LIMIT RATIO. | | | | | | |
| --- | | | | | | |
| $OH + HONO \rightarrow H_2O + NO_2$ | | | | | | |
| HYDROXYL FREE RADICAL + NITROUS ACID | | | | | | |
| 74 COX2 REACTION ORDER: 2 | 294 | 1.3(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 74 COX1 $k/k_{ref}$: 0.37 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $OH + NO + M \rightarrow HONO + M$ | | | | | | |
| | 300 | 1.1(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 75 COX | 300 | 1.3(+12) | - | - | 0.9 | 1.1 |
| 75 COX/DER2 | 298 | 2.2(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 COX/DER1 $k/k_{ref}$: 945 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H | | | | | | |
| 76 COX/DER1 | 298 | 4.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 76 COX/DER2 $k/k_{ref}$: 904 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + $CH_4$ → $H_2O$ + $CH_3$. | | | | | | |
| 76 COX/DER3 $k/k_{ref}$: 0.32 | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + $CH_3CHO$ → $H_2O$ + $CH_3C(O)$. | | | | | | |
| --- | | | | | | |
| 76 FIF REACTION ORDER: 2 | 1000-1400 | 1.6(+12) | 0 | 0 | 0.7 | 1555 |
| NOTE: ALTERNATIVE, T DEPENDENT k: | | | | | | |
| $6.92 \times 10^{12} \exp(-1760/T) cm^3 mol^{-1} s^{-1}$ | | | | | | |
| OH + $HONO_2$ → $H_2O$ + $NO_3$ | | | | | | |
| HYDROXYL FREE RADICAL + NITRIC ACID | | | | | | |
| 72 MCR/SMI REACTION ORDER: 2 | 300 | 7.8(+10) | - | - | 0.6 | 1.4 |
| 74 GLA/TRO1 | 1000-1100 | 9.5(+10) | - | - | 0.8 | 1.2 |
| 74 ZEL/SMI | 240-405 | 5.4(+10) | 0 | 0 | 0.8 | 1.2 |
| 75 MAK/KAU | 270-470 | 5.4(+10) | 0 | 0 | 0.9 | 1.1 |
| 75 SMI/ZEL | 240-406 | 4.8(+10) | 0 | 0 | 0.7 | 1.3 |
| --- | | | | | | |
| OH + $NH_2NH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + HYDRAZINE | | | | | | |
| 74 HAC/HOY1 REACTION ORDER: 2 | 298 | 1.3(+13) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| OH + CO → H + $CO_2$ | | | | | | |
| HYDROXYL FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 71 ERA/BEL1 REACTION ORDER: 2 | 1300-1900 | 4.2(+11) | 0 | 500±100 | 0.7 | 1.3 |
| 72 DIX REACTION ORDER: 2 | 1050 | 2.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 72 STU/NIK1 | 298 | 8.1(+10) | - | - | 0.9 | 1.2 |
| 73 EAY/THO | 1050 | 2.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 73 GAP/MAL | 1200-2500 | 4.0(+12) | 0 | 4025 | 0.8 | 1.2 |
| 73 PEE/MAH1 | 1750 | 2.8(+11) | - | - | | |
| 73 SMI/ZEL1 | 300 | 8.7(+10) | - | - | | |
| NOTE: WITHIN THE 210-460 RANGE, SLIGHT POSITIVE T DEPENDENCE, POSSIBLY CURVED | | | | | | |
| 73 WES/DEH1 | 298-915 | 8.0(+10) | - | - | | |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOR; WITHIN THE GIVEN T RANGE, k INCREASES FROM $8.0 \times 10^{10}$ TO $13.1 \times 10^{10} cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 74 EAV/FIS | 220-373 | 1.3(+11) | 0 | 80±40 | 0.9 | 1.1 |
| 74 HOW/EVE | 296 | 9.4(+10) | - | - | | |
| 74 TRA/ROS2 | 300 | 7.5(+10) | - | - | | |
| 75 EIC/LAZ | 1350-1750 | 4.7(+11) | 0 | 0 | | |
| 75 STE/ZEL | 300 | 9.3(+10) | - | - | 0.8 | 1.2 |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOUR WITHIN THE T RANGE 300-900K: $\log k = 10.85 + 4.0 \times 10^{-4} T$ | | | | | | |
| 75 TRA/ROS REACTION ORDER: 2 | 300 | 7.5(+10) | - | - | | |
| 75 VAN/PEE REACTION ORDER: 2 | 400-800 | 8.0(+10) | - | - | | |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOR(WITHIN THE GIVEN T RANGE, k INCREASES ONLY SLIGHTLY FROM $8.0 \times 10^{10} cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 75 VAN/PEE REACTION ORDER: 2 | 1000-1800 | 2.3(+12) | 0 | 2870 | | |
| 76 PRA/CAP REACTION ORDER: 2 $k/k_{ref}$: 0.18 | 1300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_4$ → $H_2O$ + $CH_3$ | | | | | | |
| 76 COX/DER1 REACTION ORDER: 2 $k/k_{ref}$: 38.6 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H | | | | | | |
| 76 COX/DER1 | 298 | 1.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 76 SIE/SIM1 | 217-276 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H $k/k_{ref}$: $0.20 \exp(+1710/T)$ (HIGH-PRESSURE LIMITING RATIO) | | | | | | |
| 76 SIE/SIM1 REACTION ORDER: 2 $k/k_{ref}$: 14.0 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H $k/k_{ref}$: RATIO INCREASING TO A HIGH-PRESSURE LIMITING VALUE OF 50 | | | | | | |
| 77 CRA/USE $k/k_{ref}$: 0.059 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $(CH_3)_3CH$ → $H_2O$ + $(CH_3)_3C$. + $(CH_3)_2CHCH_2$. (AT 100 TORR.) | | | | | | |
| 77 CRA/USE $k/k_{ref}$: 0.127 | 298 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: OH + $(CH_3)_2CH$ → $H_2O$ + $(CH_3)_3C.$ + $(CH_3)_2CHCH_2.$ (AT 100 TORR.) | | | | | | |
| ---------- | | | | | | |
| OH(v=1) + CO → H + $CO_2$ | | | | | | |
| HYDROXYL FREE RADICAL + CARBON MONOXIDE REACTION ORDER: 2 | | | | | | |
| 77 SFE/END | 295 | <1.8(+11) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 77 SFE/GLA | 295 | <3.0(+12) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| OH + CO + M → H + $CO_2$ + M | | | | | | |
| HYDROXYL FREE RADICAL + CARBON MONOXIDE REACTION ORDER: 2 | | | | | | |
| 75 GER/MUL1 | 298 | 9.1(+10) | - | - | 0.9 | 1.1 |
| NOTE: M=AR(710 TORR) + $H_2O$(10 TORR) + CO(10 TORR) | | | | | | |
| 76 ATK/PER M: Ar | 299 | 9.3(+10) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k (25-654 TORR) | | | | | | |
| 76 SIE/SIM2 M: $H_2$ | 298 | 2.1(+11) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k (EVALUATION) | | | | | | |
| 77 CVE/PAR1 M: He | 296 | 1.2(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k (50 TORR) | | | | | | |
| M: $SF_6$ | 296 | 2.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE k (200, AND 350 TORR) | | | | | | |
| ---------- | | | | | | |
| OH + CO + M → products | | | | | | |
| HYDROXYL FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 77 FER/ATK2 M: Ar | 299 | 9.4(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN PRESSURE RANGE 25 TO 643 TORR | 299 | 9.4(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT K INCREASING FROM $9.4 \times 10^{10}$ TO $2.1 \times 10^{11}$ $cm^3 mol^{-1} s^{-1}$ WITHIN THE 25-604 TORR. PRESSURE RANGE | | | | | | |
| ---------- | | | | | | |
| OH(v=9) + $CO_2$ → products. | | | | | | |
| HYDROXYL FREE RADICAL + CARBON DIOXIDE | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 1.4(+10) | - | - | 0.6 | 1.4 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| OH + $CH_4$ → $H_2O$ + $CH_3$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE | | | | | | |
| 73 PEE/MAH1 REACTION ORDER: 2 | 1100-1900 | 3.0(+13) | 0 | 3020 | | |
| 74 DAV/FIS | 240-373 | 1.4(+12) | 0 | 1710±90 | 0.9 | 1.1 |
| 74 MAR/KAU | 290-440 | 2.3(+12) | 0 | 1840±20 | 0.9 | 1.1 |
| 75 CVE/PAR | 295 | 3.9(+9) | - | - | 0.9 | 1.1 |
| 75 STE/ZEL | 300-700 | 2.8(+12) | 0 | 1860 | | |
| 76 COX/DER1 REACTION ORDER: 2 $k/k_{ref}$: 1.04 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H | | | | | | |
| 76 COX/DEP1 | 298 | 4.6(+9) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 76 PEW/TEVE1 | 296 | 5.7(+9) | - | - | 0.9 | 1.1 |
| 76 ZEL/STE | 300-900 | 3.47(+3) | 3.08 | 1010 | 0.8 | 1.1 |
| ---------- | | | | | | |
| OH(v=9) + $CH_4$ → $H_2O$ + $CH_3$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 8.4(+9) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| ---------- | | | | | | |
| OH(v=1) + $CH_4$ → $H_2O$ + $CH_3$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE | | | | | | |
| 77 SIE/END REACTION ORDER: 2 | 295 | <1.8(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| OH + $CH_4$ + M → $H_2O$ + $CH_3$ + M | | | | | | |
| HYDROXYL FREE RADICAL + METHANE | | | | | | |
| 75 GER/MUL1 REACTION ORDER: 2 M: $H_2O$ | 381 | 1.6(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 GER/MUL1 M: $H_2O$ | 416 | 3.3(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| OH + $CDH_3$ + M → $H_2O$ + DHO + $CDH_2$ + $CH_3$ + M | | | | | | |
| HYDROXYL FREE RADICAL + METHANE-D | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 GER/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 2.2(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| $OH + CD_2H_2 + M \rightarrow H_2O + DHO + CD_2H + CDH_2 + M$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE-$d_2$ | | | | | | |
| 75 GER/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 1.8(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| $OH + CD_3H + M \rightarrow H_2O + DHO + CD_3 + CD_2H + M$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE-$D_3$ | | | | | | |
| 75 GER/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 6.7(+9) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| $OH + CD_4 + M \rightarrow DHO + CD_3 + M$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE-$D_4$ | | | | | | |
| 75 GER/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 3.0(+9) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| $OH + HCHO \rightarrow H_2O + .CHO$ | | | | | | |
| HYDROXYL FREE RADICAL + FORMALDEHYDE | | | | | | |
| 71 MER/NIK1 REACTION ORDER: 2 | 298 | 8.4(+12) | - | - | 0.7 | 1.3 |
| 71 MER/NIK2 $k/k_{ref}$: 0.9 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + CH_3CH{=}CH_2 \rightarrow$ products | | | | | | |
| 73 PEL/MAH1 | 1400-1800 | 2.3(+13) | 0 | 0 | | |
| NOTE: TENTATIVE K | | | | | | |
| 77 VAN/VAN | 300-1600 | 3.9(+13) | 0 | 705 | | |
| NOTE: EVALUATION | | | | | | |
| $OH + CH_3OH \rightarrow H_2O + .CH_2OH$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANOL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 5.7(+13) | - | - | 0.9 | 1.1 |
| $OH + CH_3OH \rightarrow H_2O + CH_3O. + .CH_2OH$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANOL | | | | | | |
| 75 OSI/SIM REACTION ORDER: 2 $k/k_{ref}$: 0.63 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $OH + CO \rightarrow H + CO_2$ | | | | | | |
| 75 OSI/SIM $k/k_{ref}$: 0.98 | 345 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $OH + CO \rightarrow H + CO_2$ | | | | | | |
| $OH + CH_3OH \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + METHANOL | | | | | | |
| 77 ESI REACTION ORDER: 2 $k/k_{ref}$: 0.63 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $OH + CO \rightarrow$ products | | | | | | |
| 77 ESI $k/k_{ref}$: 0.98 | 345 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $OH + CO \rightarrow$ products | | | | | | |
| $OH(v=9) + CCS \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + CARBON OXIDE SULFIDE | | | | | | |
| 72 WER/CSL REACTION ORDER: 2 | 298 | 1.5(+10) | - | - | 0.4 | 1.6 |
| NOTE: UNREPORTED T. ASSUMED TO BE 298K | | | | | | |
| $OH + CH_3NO_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + METHANE, NITRO- | | | | | | |
| 75 CAM/GOO$_2$ REACTION ORDER: 2 | 292 | 5.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| $OH + CH_3ONO \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + NITROUS ACID METHYL ESTER | | | | | | |
| 75 CAM/GOO$_2$ REACTION ORDER: 2 | 292 | 8.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| $OH + CH{\equiv}CH \rightarrow H + CH_2{=}C{=}O$ | | | | | | |
| HYDROXYL FREE RADICAL + ETHYNE | | | | | | |
| 77 VAN/VAN REACTION ORDER: 2 | 570-850 | 3.2(+11) | 0 | 100 | | |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| OH + CH≡CH → $H_2$ + CH≡CO. | | | | | | |
| HYDROXYL FREE RADICAL + ETHYNE | | | | | | |
| 71 BRE/GLA REACTION ORDER: 2 | 295 | 1.1(+11) | - | - | 0.7 | 1.3 |
| OH + CH≡CH → CO + $CH_3$ | | | | | | |
| HYDROXYL FREE RADICAL + ETHYNE | | | | | | |
| 77 VAN/VAN REACTION ORDER: 2 | 650-1110 | 5.5(+13) | 0 | 6900 | | |
| NOTE: EVALUATION | | | | | | |
| OH + CH≡CH → products | | | | | | |
| HYDROXYL FREE RADICAL + ETHYNE | | | | | | |
| 73 SMI/ZEL1 REACTION ORDER: 2 | 210-460 | 1.2(+12) | 0 | 250 | | |
| 74 PAS/CAR | 298 | 1.2(+11) | - | - | 0.7 | 1.3 |
| OH + CH≡CH + M → products | | | | | | |
| HYDROXYL FREE RADICAL + ETHYNE | | | | | | |
| 74 EAV/FIS REACTION ORDER: 2 M: He | 300 | 9.9(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE INDEPENDENT | | | | | | |
| 77 PER/ATK REACTION ORDER: 2 M: Ar | 288-422 | 1.2(+12) | 0 | 310±200 | | |
| NOTE: AT PRESSURES ≥200 TORR | | | | | | |
| OH + $CH_2$=$CH_2$ → $H_2O$ + $CH_2$=CH. | | | | | | |
| HYDROXYL FREE RADICAL + ETHENE | | | | | | |
| 76 BRA/CAP REACTION ORDER: 2 $k/k_{ref}$: 2.33 | 1300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_4$ → $H_2O$ + $CH_3$. | | | | | | |
| 76 MIA/HEI $k/k_{ref}$: 0.26 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_2$=$CH_2$ → $H_2O$ + $CH_2$=CH. + .$CH_2CH_2OH$* | | | | | | |
| OH + $CH_2$=$CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + ETHENE | | | | | | |
| 71 MEP/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 0.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH$=$CH_2$ → products | | | | | | |
| 71 MER/STE | 300 | 1.1(+12) | - | - | 0.7 | 1.3 |
| 73 BRA/HAC | 298 | 1.0(+12) | - | - | 0.7 | 1.3 |
| 73 STI | 298 | 1.8(+12) | - | - | 0.7 | 1.3 |
| 73 SMI/ZEL1 | 210-460 | 4.5(+12) | 0 | 110 | | |
| 75 PAS/CAR | 300 | 1.4(+12) | - | - | 0.9 | 1.1 |
| 75 CEX | 300 | 5.7(+12) | - | - | 0.9 | 1.1 |
| 76 LLO/DAR2 | 305 | 5.2(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| OH + $CH_2$=$CH_2$ + M → .$CH_2CH_2OH$ + M | | | | | | |
| HYDROXYL FREE RADICAL + ETHENE | | | | | | |
| 77 ATK/PER REACTION ORDER: 2 M: Ar | 299-425 | 1.3(+12) | 0 | 390±150 | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| OH + $CH_2$=$CH_2$ + M → .$CH_2CH_2OH$ + M | | | | | | |
| HYDROXYL FREE RADICAL + ETHENE | | | | | | |
| 77 CVE/PAR2 REACTION ORDER: 2 | 296 | 6.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| OH + $CH_2$=$CH_2$ + M → products | | | | | | |
| HYDROXYL FREE RADICAL + ETHENE | | | | | | |
| 75 EAV/FIS REACTION ORDER: 2 M: He | 300 | 3.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE k M: $H_2O$ | 381 | 3.8(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 GOK/MUL1 M: $H_2O$ | 416 | 4.4(+12) | - | - | | |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 76 HOW REACTION ORDER:2 | 296 | 2.4(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| OH + $CH_3CH_3$ → $H_2O$ + $CH_3CH_2$. | | | | | | |
| HYDROXYL FREE RADICAL + ETHANE | | | | | | |
| 75 HUC/DOO REACTION ORDER: 2 $k/k_{ref}$: 9.6 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + $CH_4$ → $H_2O$ + $CH_3$. | | | | | | |
| 75 OVE/PAR | 295 | 1.6(+11) | - | - | 0.9 | 1.1 |
| 76 BRA/CAP REACTION ORDER: 2 $k/k_{ref}$: 2.88 | 1300 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: OH + $CH_4$ → $H_2O$ + $CH_3$• | | | | | | |
| 76 HOW/EVE2 | 296 | 1.7(+11) | - | - | 0.8 | 1.2 |
| OH + $CH_3CH_3$ + M → $H_2O$ + $CH_3CH_2$• + M | | | | | | |
| HYDROXYL FREE RADICAL + ETHANE REACTION ORDER: 2 M: $H_2O$ | | | | | | |
| 75 GOK/MUL1 | 381 | 4.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR M: $H_2O$ | 416 | 4.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| OH + $CH_2$=C=O → .CHO + HCHO | | | | | | |
| HYDROXYL FREE RADICAL + ETHENONE REACTION ORDER: 2 | | | | | | |
| 77 VAN/VAN | 480-1000 | 2.8(+13) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| OH + $CH_3CHO$ → $H_2O$ + $CH_3C(O)$• | | | | | | |
| HYDROXYL FREE RADICAL + ACETALDEHYDE $k/k_{ref}$: 0.90 | | | | | | |
| 71 MOR/NIK2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH$=$CH_2$ | | | | | | |
| 71 MOR/STE | 300 | 9.0(+12) | - | - | 0.7 | 1.3 |
| 76 COX/DER | 296 | 1.2(+13) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| OH + $CH_3CH_2OH$ → $H_2O$ + .$CH_2CH_2OH$ | | | | | | |
| HYDROXYL FREE RADICAL + ETHANOL REACTION ORDER: 2 | | | | | | |
| 76 CAM/MCL | 292 | 1.8(+12) | - | - | 0.9 | 1.1 |
| OH + $CH_3OCH_3$ → $H_2O$ + .$CH_2OCH_3$ | | | | | | |
| HYDROXYL FREE RADICAL + METHANE, OXYBIS- REACTION ORDER: 2 | | | | | | |
| 77 PER/ATK1 | 299-427 | 7.8(+12) | 0 | 390±150 | | |
| OH + $CH_3C(O)OONO_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + PEROXIDE, ACETYL NITRO- REACTION ORDER: 2 | | | | | | |
| 77 WIN/LIO | 299 | <1.0(+11) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| OH + O=C=C=C=O → $CO_2$ + .CH=C=O | | | | | | |
| HYDROXYL FREE RADICAL + 1,2-PROPADIENE-1,3-DIONE REACTION ORDER: 2 | | | | | | |
| 77 BAU/WAG2 | 295-480 | 7.0(+12) | 0 | 620±160 | 0.6 | 1.4 |
| OH + $CH_3C$≡CH → products | | | | | | |
| HYDROXYL FREE RADICAL + PROPYNE REACTION ORDER: 2 | | | | | | |
| 73 BRA/HAC | 298 | 5.7(+11) | - | - | 0.8 | 1.2 |
| OH + $CH_2$=C=$CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 1,2-PROPADIENE REACTION ORDER: 2 | | | | | | |
| 73 BRA/HAC | 298 | 2.7(+12) | - | - | 0.4 | 1.6 |
| 77 ATK/PER3 | 299-424 | 3.4(+12) | 0 | -153±150 | 0.9 | 1.1 |
| OH + $CH_3CH$=$CH_2$ → $H_2O$ + .$CH_2CH$=$CH_2$ | | | | | | |
| HYDROXYL FREE RADICAL + PROPENE REACTION ORDER: 2 | | | | | | |
| 76 GER | 298 | 8.3(+12) | - | - | 0.8 | 1.2 |
| 74 GEF/VOL | 298 | 8.1(+12) | - | - | 0.7 | 1.3 |
| OH + $CH_3CH$=$CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + PROPENE REACTION ORDER: 2 $k/k_{ref}$: 1.0 | | | | | | |
| 71 MOR/NIK2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH$=$CH_2$ → products | | | | | | |
| 71 MOR/STE | 300 | 1.0(+13) | - | - | 0.7 | 1.3 |
| 73 BRA/HAC | 298 | 3.0(+12) | - | - | 0.7 | 1.3 |
| 73 SIM/HEI2 REACTION ORDER: 2 $k/k_{ref}$: 75.0 | 373 | - | - | - | 0.9 | 1.1 |
| 73 SIM/HEI2 $k/k_{ref}$: 55.0 | 473 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + CO → H + $CO_2$ | | | | | | |
| 73 SIM/HEI2 REACTION ORDER : 2 | 373-473 | 8.2(+12) | 0 | 50 | | |
| NOTE: EVALUATION | | | | | | |
| 73 STU | 298 | 8.7(+12) | - | - | 0.8 | 1.2 |
| 75 ATK/PIT | 297-425 | 2.5(+12) | 0 | -545±150 | | |
| 75 COX | 300 | 2.2(+13) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 PAS/CAR | 300 | 3.0(+12) | - | - | 0.8 | 1.2 |
| 76 LIO/DAR2 | 305 | 1.8(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 76 WIN/LIO | 305 | 1.5(+13) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH + CD_3CD{=}CD_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PROPENE-D6 | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 1.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + CH_3CH{=}CH_2 \rightarrow$ products | | | | | | |
| 72 STU | 298 | 1.0(+13) | - | - | | |
| ---------- | | | | | | |
| $OH + CH_3CH{=}CH_2 + M \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PROPENE | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 381 | 8.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $OH + CH_3CH{=}CH_2 + M \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PROPENE | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 1.2(+13) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH_3 \rightarrow H_2O + (CH_3)_2CH. + CH_3CH_2CH_2.$ | | | | | | |
| HYDROXYL FREE RADICAL + PROPANE | | | | | | |
| 74 GOR/VOL REACTION ORDER: 2 | 298 | 1.3(+12) | - | - | 0.7 | 1.3 |
| 75 BAR/EUR | 329 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 75 OVE/PAR | 295 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 75 HUC/DOO $k/k_{ref}$: 2.18 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $OH + CH_3CH_3 \rightarrow H_2O + CH_3CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH_3 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PROPANE | | | | | | |
| 73 BRA/HAC REACTION ORDER: 2 | 298 | 5.0(+11) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH_3 + M \rightarrow H_2O + (CH_3)_2CH. + CH_3CH_2CH_2. + M$ | | | | | | |
| HYDROXYL FREE RADICAL + PROPANE | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 381 | 1.3(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 | 416 | 1.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $OH + CH_2{=}CHCH_2OH + M \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + 2-PROPEN-1-OL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 | 440 | 1.6(+13) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $OH + CH_2{=}CHOCH_3 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + ETHENE, METHOXY- | | | | | | |
| 77 PER/ATK1 REACTION ORDER: 2 | 299-427 | 3.7(+12) | 0 | -510±150 | | |
| ---------- | | | | | | |
| $OH + CH_3CH_2CHO \rightarrow H_2O + CH_3CH_2C(O).$ | | | | | | |
| HYDROXYL FREE RADICAL + PROPANAL | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 1.8 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + CH_3CH{=}CH_2 \rightarrow$ products | | | | | | |
| 72 VOL/GOR | 298 | 2.3(+12) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH_2OH \rightarrow H_2O + [.C_3H_6OH]$ | | | | | | |
| HYDROXYL FREE RADICAL + 1-PROPANOL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 2.3(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $OH + (CH_3)_2CHOH \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + 2-PROPANOL | | | | | | |
| 76 LIO/DAR1 REACTION ORDER: 2 | 305 | 4.3(+12) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH + CH_2{=}CHCH{=}CH_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + 1,3-BUTADIENE | | | | | | |
| LIO/DAR2 REACTION ORDER: 2 | 305 | 4.6(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 ATK/PER3 | 299-424 | 8.7(+12) | 0 | -468±150 | 0.9 | 1.1 |
| ---------- | | | | | | |
| OH + $CH_3CH_2CH{=}CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 1-BUTENE | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 2.4 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH{=}CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 1-BUTENE | | | | | | |
| 75 ATK/PIT | 297-425 | 4.6(+12) | 0 | -470±150 | | |
| 75 PAS/CAR | 300 | 9.0(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| OH + cis-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + cis-2-BUTENE | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 3.6 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH{=}CH_2$ → products | | | | | | |
| 75 ATK/PIT | 297-425 | 6.3(+12) | 0 | -490±150 | | |
| 76 LIO/DAR2 | 305 | 3.9(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 76 WIN/LLO | 305 | 3.7(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| OH + trans-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + trans-2-BUTENE | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 4.2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH{=}CH_2$ → products | | | | | | |
| 75 CEX | 300 | 6.4(+13) | - | - | 0.7 | 1.3 |
| 75 ATK/PIT | 297-425 | 6.7(+12) | 0 | -550±150 | | |
| 75 PAS/CAR | 300 | 7.2(+12) | - | - | 0.2 | 1.8 |
| ---------- | | | | | | |
| 71 MOR/NIK2 $k/k_{ref}$: 3.8 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH{=}CH_2$ → products | | | | | | |
| 75 ATK/PIT | 297-425 | 5.5(+12) | 0 | -500±150 | | |
| ---------- | | | | | | |
| OH + $CH_3CH_2CH_2CH_3$ → $H_2O$ + $CH_3CH_2CH_2CH_2$. | | | | | | |
| HYDROXYL FREE RADICAL + BUTANE | | | | | | |
| 75 CAM/HAN1 REACTION ORDER: 2 $k/k_{ref}$: 14.8 | 292 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + CO → H + $CO_2$ | | | | | | |
| ---------- | | | | | | |
| OH + $CH_3CH_2CH_2CH_3$ → $H_2O$ + $CH_3CH_2CH(.)CH_3$ + $CH_3CH_2CH_2CH_2$. | | | | | | |
| HYDROXYL FREE RADICAL + BUTANE | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 0.24 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH{=}CH_2$ → products | | | | | | |
| 73 GOR | 298 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 73 STU | 298 | 1.4(+12) | - | - | 0.9 | 1.1 |
| 74 GOF/VOL | 298 | 1.7(+12) | - | - | 0.8 | 1.2 |
| 75 HUC/BOO REACTION ORDER: 2 $k/k_{ref}$: 1.54 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + $CH_3CH_2CH_3$ → $H_2O$ + $(CH_3)_2CH.$ + $CH_3CH_2CH_2.$ | | | | | | |
| 76 PER/ATK2 | 297-420 | 1.1(+13) | 0 | 560±150 | | |
| ---------- | | | | | | |
| OH + $CH_3CH_2CH_2CH_3$ + M → $H_2O$ + $CH_3CH_2CH(.)CH_3$ + $CH_3CH_2CH_2CH_2$. + M | | | | | | |
| HYDROXYL FREE RADICAL + BUTANE | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 | 298 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: M=AR(710 TORR) + $H_2O$(10 TORR) + $C_4H_{10}$(0.54-2.46 TORR) | | | | | | |
| 75 GOR/MUL1 M: $H_2O$ | 381 | 2.5(+12) | - | - | 0.9 | 1.1 |
| M: $H_2O$ | 416 | 3.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| OH + $(CH_3)_3CH$ → $H_2O$ + $(CH_3)_3C.$ + $(CH_3)_2CHCH_2.$ | | | | | | |
| HYDROXYL FREE RADICAL + PROPANE, 2-METHYL- | | | | | | |
| 72 GOF/VOL REACTION ORDER: 2 | 298 | 2.1(+12) | - | - | 0.8 | 1.2 |
| 75 HUC/BOO $k/k_{ref}$: 1.28 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: OH + $CH_3CH_2CH_3$ → $H_2O$ + $(CH_3)_2CH.$ + $CH_3CH_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| OH + $CH_3COCH_2CH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 2-BUTANONE | | | | | | |
| 76 WIN/LIO REACTION ORDER: 2 | 305 | 2.0(+12) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION | | | | | | |
| OH + cy-$CH_2CH_2CH_2CH_2O$ → products | | | | | | |
| HYDROXYL FREE RADICAL + FURAN, TETRAHYDRO- | | | | | | |
| 77 WIN/LIS REACTION ORDER: 2 | 305 | 8.8(+12) | - | - | 0.8 | 1.2 |
| OH + $CH_3CH_2CH_2CH_2OH$ → $H_2O$ + [.$C_4H_9O$] | | | | | | |
| HYDROXYL FREE RADICAL + 1-BUTANOL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 4.1(+12) | - | - | 0.9 | 1.1 |
| OH + $CH_3CH_2OCH_2CH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + ETHANE, 1,1-OXYBIS- | | | | | | |
| 76 ILO/DAR1 REACTION ORDER: 2 | 305 | 5.6(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| OH + $CH_3CH_2CH_2CH=CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 1-PENTENE | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 2.5 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH=CH_2$ → products | | | | | | |
| OH + $CH_3CH_2CH=CHCH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 2-PENTENE | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 5.3 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH=CH_2$ → products | | | | | | |
| OH + $CH_3CH_2C(CH_3)=CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 1-BUTENE,2-METHYL- | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 5.3 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH=CH_2$ → products | | | | | | |
| OH + $(CH_3)_2CHCH=CH_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 1-BUTENE, 3-METHYL- | | | | | | |
| 77 ATK/PER3 REACTION ORDER: 2 | 299-424 | 3.2(+12) | 0 | -533±150 | 0.9 | 1.1 |
| OH + $CH_3CH=C(CH_3)_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 2-BUTENE, 2-METHYL- | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 7.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH=CH_2$ → products | | | | | | |
| 76 ATK/PER1 | 297-425 | 2.2(+13) | 0 | -226±200 | | |
| OH + $(CH_3)_2CHCH_2CH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + BUTANE, 2-METHYL- | | | | | | |
| 76 ILO/DAR2 REACTION ORDER: 2 | 305 | 2.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| OH + $(CH_3)_4C$ → $H_2O$ + $(CH_3)_3CCH_2$. | | | | | | |
| HYDROXYL FREE RADICAL + PROPANE, 2,2-DIMETHYL- | | | | | | |
| 76 EAK/BAL REACTION ORDER: 2 $k/k_{ref}$: 10.0 | 753 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $H_2$ → $H_2O$ + H. (OPTIMIZATION) | | | | | | |
| 76 EAK/BAL | 753 | 3.9(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| OH + $CH_3COOCH_2CH_2CH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + ACETIC ACID PROPYL ESTER | | | | | | |
| 77 WIN/LIS REACTION ORDER: 2 | 305 | 2.6(+12) | - | - | 0.8 | 1.2 |
| OH + $(CH_3)_2C=C(CH_3)_2$ → products | | | | | | |
| HYDROXYL FREE RADICAL + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 9.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: OH + $CH_3CH=CH_2$ → products | | | | | | |
| OH + $CH_3(CH_2)_4CH_3$ → $H_2O$ + [.$C_6H_{13}$] | | | | | | |
| HYDROXYL FREE RADICAL + HEXANE | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 3.3(+12) | - | - | 0.9 | 1.1 |
| OH + $CH_3(CH_2)_4CH_3$ → products | | | | | | |
| HYDROXYL FREE RADICAL + HEXANE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in $^{o}K$) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 LIO/DAR2 REACTION ORDER: 2 | 305 | 3.8(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH + (CH_3)_2CHCH_2CH_2CH_3 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PENTANE, 2-METHYL- | | | | | | |
| 76 LIO/DAR2 REACTION ORDER: 2 | 305 | 3.2(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH(CH_3)CH_2CH_3 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PENTANE, 3-METHYL- | | | | | | |
| 76 LIO/DAR2 REACTION ORDER: 2 | 305 | 4.3(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH + (CH_3)_2CHCH(CH_3)_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + BUTANE, 2,3-DIMETHYL- | | | | | | |
| 76 DAR/WIN REACTION ORDER: 2 $k/k_{ref}$: 0.1 | 305 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + (CH_3)_2C{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $OH + CH_3COCH_2CH(CH_3)_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + 2-PENTANONE, 4-METHYL- | | | | | | |
| 76 WIN/LIO REACTION ORDER: 2 | 305 | 9.0(+12) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $OH + CH_3COOCH(CH_3)CH_2CH_3 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + ACETIC ACID 1-METHYLETHYL ESTER | | | | | | |
| 77 WIN/LIO REACTION ORDER: 2 | 305 | 3.4(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH_2OCH_2CH_2CH_3 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + PROPANE, 1,1-OXYBIS- | | | | | | |
| 76 LIO/DAR1 REACTION ORDER: 2 | 305 | 1.0(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $OH + CH_3CH_2CH_2CH_2CH_2CH{=}CH_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + 1-HEPTENE | | | | | | |
| 76 DAR/WIN REACTION ORDER: 2 $k/k_{ref}$: 0.73 | 305 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + (CH_3)_2C{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $OH + (CH_3)_3CCH(CH_3)_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + BUTANE, 2,2,3-TRIMETHYL- | | | | | | |
| 76 DAR/WIN REACTION ORDER: 2 $k/k_{ref}$: 0.74 | 305 | - | - | - | | |
| NOTE: $k_{ref}$: $OH + (CH_3)_2C{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $OH + (CH_3)_2CHCH_2COCH_2CH(CH_3)_2 \rightarrow$ products | | | | | | |
| HYDROXYL FREE RADICAL + 4-HEPTANONE, 2,6-DIMETHYL- | | | | | | |
| 76 WIN/LIO REACTION ORDER: 2 | 305 | 1.5(+13) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + O \rightarrow O_2 + OH$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + OXYGEN ATOM | | | | | | |
| 73 PEE/MAH REACTION ORDER: 2 | 1600 | 5.0(+13) | - | - | | |
| NOTE: TENTATIVE k | | | | | | |
| 77 BUR/HAR | 293 | 2.1(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $HO_2 + O_3 \rightarrow OH + O_2 + O_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + OZONE | | | | | | |
| 73 AND/KAU2 REACTION ORDER: 2 | 220-450 | <3.0(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 73 DEM | 300 | 1.8(+9) | - | - | | |
| 73 SIM/HEI3 | 225-298 | 2.0(+10) | 0 | 1010 | | |
| NOTE: EVALUATION | | | | | | |
| 74 DEM/TSC | 273-342 | 1.2(+11) | 0 | 1560±250 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + H \rightarrow O_2 + H_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 71 BEN/BLA REACTION ORDER: 3 $k/k_{ref}$: 0.75 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow OH + OH$ | | | | | | |
| 72 WES/DEH1 $k/k_{ref}$: 0.63 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow$ products. EVALUATION | | | | | | |
| 76 HAC/WAG | 293 | 6.7(+12) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| --- | | | | | | |
| $HO_2 + H \rightarrow OH + OH$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 72 WES/DEH1 REACTION ORDER: 2 $k/k_{ref}$: 0.27 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow$ products. EVALUATION | | | | | | |
| 76 HAC/WAG | 293 | 1.6(+13) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $HO_2 + H \rightarrow H_2O + O$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 72 WES/DEH1 REACTION ORDER: 2 $k/k_{ref}$: 0.11 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow$ products. EVALUATION | | | | | | |
| --- | | | | | | |
| $HO_2 + H \rightarrow H_2O + O + OH + OH$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 72 DAY/DIX REACTION ORDER: 2 $k/k_{ref}$: 6.5 | 300-1800 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow H_2 + O_2$. EVALUATION | | | | | | |
| 73 DAY/THO REACTION ORDER: 2 $k/k_{ref}$: 6.5 | 300-1050 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow H_2 + O_2$. EVALUATION | | | | | | |
| --- | | | | | | |
| $HO_2 + OH \rightarrow O_2 + H_2O$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + HYDROXYL FREE RADICAL | | | | | | |
| 72 CAS/SCH REACTION ORDER: 2 | 2130 | 1.2(+13) | - | - | | |
| 72 DAY/DIX REACTION ORDER: 2 $k/k_{ref}$: ≤5.5 | 300-1800 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow O_2 + H_2$ UPPER LIMIT RATIO | | | | | | |
| 72 HOC/GHO | 298 | 1.2(+14) | - | - | 0.8 | 1.2 |
| 73 DAY/THO $k/k_{ref}$: ≤5.5 | 300-1050 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow H_2 + O_2$ UPPER LIMIT RATIO | | | | | | |
| 73 PEE/MAH1 | 1600 | 5.0(+13) | - | - | | |
| NOTE: TENTATIVE k | | | | | | |
| 74 DEM/TSC | 298 | 9.6(+13) | - | - | 0.3 | 3.0 |
| 75 HAC/HOY | 298-670 | <2.0(+13) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 77 BUR/PAR | 293 | 3.1(+13) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL | | | | | | |
| 72 HOC/GHO REACTION ORDER: 2 | 298 | 5.7(+12) | - | - | 0.9 | 1.1 |
| 72 PAD/JOH | 295 | 2.2(+12) | - | - | 0.9 | 1.1 |
| 75 HAM | 298 | 1.9(+12) | - | - | | |
| 77 HAM/LII | 298 | 1.5(+12) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $HO_2 + SO_2 \rightarrow OH + SO_3$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + SULFUR DIOXIDE | | | | | | |
| 73 PAY/STI REACTION ORDER: 2 | 300 | 5.2(+8) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $HO_2 + NO \rightarrow NO_2 + OH$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 73 PAY/STI REACTION ORDER: 2 | 300 | 1.8(+11) | - | - | 0.3 | 3.0 |
| NOTE: EVALUATION | | | | | | |
| 73 SIM/HEI1 | 298 | >9.0(+10) | - | - | | |
| NOTE: EVALUATION. LOWER LIMIT k | | | | | | |
| 74 HAC/HOY2 | 298-669 | 2.0(+13) | 0 | 1430 | 0.5 | 1.5 |
| 74 SIM/HEI2 $k/k_{ref}$: 7.0 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $HO_2 + NO_2 \rightarrow HONO + O_2$ | | | | | | |
| 75 COX | 300 | 7.2(+11) | - | - | 0.7 | 1.3 |
| 75 COX/DER1 | 296 | 7.2(+11) | - | - | 0.8 | 1.3 |
| 75 GLA/TRO | 1350-1700 | 4.5(+12) | - | - | 0.8 | 1.2 |
| 75 HAC/HOY | 298-670 | 1.2(+13) | 0 | 1200±150 | 0.7 | 1.3 |
| 76 SIM/HEI | 296 | 6.0(+11) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 77 ROW/EVE | 296 | 4.9(+12) | - | - | 0.8 | 1.2 |
| 77 SIM/HEI | 245-328 | 7.2(+12) | 0 | 710±250 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $HO_2 + NO \rightarrow NO_2 + OH + HONO_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 76 SIM/HEI REACTION ORDER: 2 $k/k_{ref}$: 9.5 | 295 | - | - | - | 0.6 | 1.4 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in $^{o}K$) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $HO_2 + NO_2 \rightarrow [HO_2.NO_2]$ | | | | | | |
| ---------- | | | | | | |
| $HO_2 + NO \rightarrow HONO_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 75 CEX/DER1 REACTION ORDER: 2 | 296 | 8.4(+10) | - | - | 0.8 | 1.3 |
| NOTE: OPTIMIZATION | | | | | | |
| 76 SIM/HEI | 296 | <1.2(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $HO_2 + NO(+M) \rightarrow HONO_2(+M)$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 75 CEX REACTION ORDER: 2 | 300 | 8.4(+10) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $HO_2 + NO_2 \rightarrow [HO_2.NO_2]$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 76 SIM/HEI REACTION ORDER: 2 | 296 | 5.9(+10) | - | - | 0.6 | 1.4 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + NO_2 \rightarrow O_2 + HONO$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 74 SIM/HEI2 REACTION ORDER: 2 | 298 | >1.8(+11) | - | - | | |
| NOTE: LOWER LIMIT k | | | | | | |
| 75 CEX | 300 | 7.2(+10) | - | - | 0.7 | 1.3 |
| 75 CEX/DER1 | 296 | 7.2(+10) | - | - | 0.8 | 1.3 |
| NOTE: OPTIMIZATION | | | | | | |
| 77 BEW | 300 | <1.8(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 77 LEV/USE $k/k_{ref}$: 0.043 | 297 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $HO_2 + NO \rightarrow OH + NO_2$ EVALUATION | | | | | | |
| ---------- | | | | | | |
| 77 LEV/USE $k/k_{ref}$: 0.7 | 297 | - | - | - | 0.4 | 1.6 |
| NOTE: $k_{ref}$: $HO_2 + NO_2(+M) \rightarrow HOONO_2(+M)$ EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + NO_2 \rightarrow HOONO_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 77 SIM/HEI REACTION ORDER: 2 | 245-328 | 2.5(+11) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + NO_2 + M \rightarrow HOONO_2 + M$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 77 BEW REACTION ORDER: 3 M: $O_2$ | 300 | 5.5(+16) | - | - | 0.7 | 1.3 |
| 77 BEW M: He | 300 | 3.6(+16) | - | - | 0.7 | 1.3 |
| 77 BEW M: $N_2$ | 300 | 7.6(+16) | - | - | 0.8 | 1.2 |
| 77 BEW M: $NO_2$ | 300 | 2.4(+17) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |
| $HO_2 + CO \rightarrow OH + CO_2$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 72 VAR/DAN REACTION ORDER: 2 | 878-952 | 1.3(+14) | 0 | 11600±1500 | | |
| 72 WES/DEH1 M: 0.06 | 299 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2 + H \rightarrow OH + OH$ EVALUATION | | | | | | |
| 73 DAV/PAY | 300 | <6.0(+3) | - | - | | |
| NOTE: EVALUATION. UPPER LIMIT k | | | | | | |
| 73 SIM/HEI1 | 373-473 | <3.0(+6) | - | - | | |
| NOTE: EVALUATION. UPPER LIMIT k | | | | | | |
| 76 GER | 298 | <9.6(7) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 75 VAR/SAC | 878-952 | 1.0(+14) | 0 | 11600±1500 | 0.7 | 1.3 |
| 77 COI/NAE | 1110 | 5.6(+9) | - | - | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + HCHO \rightarrow H_2O_2 + .CHO$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + FORMALDEHYDE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 1.4(+9) | - | - | | |
| 72 BAL/FUL | 773 | 9.6(+8) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2 + CH_2{=}CH_2 \rightarrow OH + cy\text{-}CH_2CH_2O$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + ETHENE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 WAL2 REACTION ORDER: 2 $k/k_{ref}$: 0.016 | 773 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $HO_2$ + HCHO → $H_2O_2$ + .CHO | | | | | | |
| 73 WAL2 | 773 | 1.5(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $CH_3CH_3$ → $H_2O_2$ + $CH_3CH_2$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + ETHANE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 $k/k_{ref}$: 0.028 | 713 | - | - | - | | |
| NOTE: $k_{ref}$: HCHO + $CH_3CH_3$ → products | | | | | | |
| 73 BAL/FUL $k/k_{ref}$: 0.03 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2$ + HCHO → $H_2O_2$ + .CHO | | | | | | |
| | 773 | 3.0(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $CH_3CHO$ → $H_2O_2$ + $CH_3C(O)$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + ACETALDEHYDE | | | | | | |
| 77 CEL/NAE REACTION ORDER: 2 | 1030-1115 | 1.7(+12) | 0 | 5350 | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + .$CH_2CH_2OH$ → $O_2$ + $CH_3CH_2OH$ | | | | | | |
| HYDROPEROXYL FREE RADICAL + ETHYL, 2-HYDROXY-, FREE RADICAL | | | | | | |
| 76 MEA/HEI REACTION ORDER: 2 $k/k_{ref}$: 1.2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2$ + .$CH_2CH_2OH$ → $H_2O$ + HCHO + HCHO | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $CH_3CH_2CH_3$ → $H_2O_2$ + $CH_3CH_2CH_2$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + PROPANE | | | | | | |
| 73 BAL/FUL REACTION ORDER: 2 $k/k_{ref}$: 0.03 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2$ + HCHO → $H_2O_2$ + .CHO | | | | | | |
| | 773 | 3.1(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $CH_3CH_2CH_3$ → $H_2O_2$ + $(CH_3)_2CH$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + PROPANE | | | | | | |
| 73 BAL/FUL REACTION ORDER: 2 $k/k_{ref}$: 0.048 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2$ + HCHO → $H_2O_2$ + .CHO | | | | | | |
| | 773 | 4.8(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $CH_3CH_2CH_3$ → $H_2O_2$ + $(CH_3)_2CH$. + $CH_3CH_2CH_2$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + PROPANE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 $k/k_{ref}$: 0.088 | 713 | - | - | - | | |
| NOTE: $k_{ref}$: HCHO + $CH_3CH_2CH_3$ → products | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $CH_3CH_2CHO$ → $H_2O_2$ + $CH_3CH_2C(O)$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + PROPANAL | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 1.8(+9) | - | - | | |
| ---------- | | | | | | |
| $HO_2$ + $(CH_3)_3CH$ → $H_2O_2$ + $(CH_3)_2CHCH_2$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + PROPANE, 2-METHYL- | | | | | | |
| 73 BAL/FUL REACTION ORDER: 2 $k/k_{ref}$: 0.045 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2$ + HCHO → $H_2O_2$ + .CHO | | | | | | |
| | 773 | 4.6(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + $(CH_3)_3CH$ → $H_2O_2$ + $(CH_3)_3C$. | | | | | | |
| HYDROPEROXYL FREE RADICAL + PROPANE, 2-METHYL- | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 $k/k_{ref}$: 0.155 | 713 | - | - | - | | |
| NOTE: $k_{ref}$: HCHO + $(CH_3)_3CH$ → products | | | | | | |
| 73 BAL/FUL $k/k_{ref}$: 0.133 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HO_2$ + HCHO → $H_2O_2$ + .CHO | | | | | | |
| 73 BAL/FUL | 773 | 1.4(+8) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HO_2$ + CH .$CH_2CHO$ → $H_2O_2$ + $CH_3CH_2CH_2C(O)$. | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| HYDROPEROXYL FREE RADICAL + BUTANAL<br>71 LAL/LAN REACTION ORDER: 2 | 713 | 2.4(+9) | - | - | | |
| $HO_2 + (CH_3)_2CHCH(CH_3)_2 \rightarrow H_2O_2 + (CH_3)_2CHC(.)(CH_3)_2$<br>HYDROPEROXYL FREE RADICAL + BUTANE, 2,3-DIMETHYL-<br>75 ALC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 2.5(+5) | - | - | | |
| $H_2O + O \rightarrow OH + OH$<br>WATER + OXYGEN ATOM<br>71 AIB/HOY REACTION ORDER: 2 | 753-1045 | 4.0(+13) | 0 | 8700±250 | | |
| $H_2O + O^*(^1D) \rightarrow OH + OH$<br>WATER + OXYGEN ATOM<br>71 SCO/CVE REACTION ORDER: 2 $k/k_{ref}$: 1.5<br>NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow N2 + O_2 + NO + NO$ | 296 | - | - | - | 0.9 | 1.1 |
| 72 FER/SNE $k/k_{ref}$: 3.5<br>NOTE: $k_{ref}$: $N2 + O^*(^1D) \rightarrow N2 + O$ | 295 | - | - | - | | |
| 72 SIM/HEI2 | 300-423 | - | - | - | | |
| NOTE: $k_{ref}$: $CO + O^*(^1D) \rightarrow CO + O(^3P)$;<br>$k/k_{ref}$: $3.8\times10^{-1}\exp(624/T)$. (EVALUATION)<br>73 HEI/HUS1 | 300 | 1.8(+14) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 4.4 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow$ products<br>73 SIM/HEI2 $k/k_{ref}$: 2.1 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow$ products<br>75 GAU/SNE $k/k_{ref}$: 5.0 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow O_2^*(^1\Sigma_g^+) + O$ | 300 | 2.2(+14) | - | - | | |
| NOTE: EVALUATION<br>76 DAV/SAD | 298 | 1.3(+14) | - | - | 0.5 | 1.5 |
| 76 STK/HOW | 253-353 | 1.4(+14) | 0 | 0 | 0.9 | 1.1 |
| $H_2O + OH(v=9) \rightarrow$ products<br>WATER + HYDROXYL FREE RADICAL<br>72 WER/COL REACTION ORDER: 2<br>NOTE: LOWER LIMIT k. UNREPORTED T ASSUMED TO BE 298K | 298 | >1.2(+11) | - | - | 0.2 | 1.8 |
| $H_2O + SO_3 \rightarrow H_2SO_4$<br>WATER + SULFUR TRIOXIDE<br>75 CAS/DAV REACTION ORDER: 2 | 298 | 5.5(+11) | - | - | 0.8 | 1.2 |
| $H_2O + NO + NO_2 \rightarrow HONO + HONO$<br>WATER + NITROGEN OXIDE (NO) + NITROGEN OXIDE ($NO_2$)<br>75 ENG/CAR REACTION ORDER: 3 | 298-323 | 1.5(+11) | 0 | 0 | | |
| 76 CBA/NOR | 296 | 2.2(+10) | - | - | 0.7 | 1.3 |
| $H_2O + NO_2 \rightarrow OH + HONO$<br>WATER + NITROGEN OXIDE ($NO_2$)<br>76 FIF REACTION ORDER: 2<br>NOTE: $k_1 = Kk_{-1}$ | 1000-1400 | 8.3(+12) | 0 | 21140 | | |
| $H_2O + NO_2 + NO_2 \rightarrow HONO + HONO_2$<br>WATER + NITROGEN OXIDE ($NO_2$)<br>74 ENG/CAR REACTION ORDER: 3 | 298-323 | 1.0(+10) | 0 | -492±10 | 0.9 | 1.1 |
| $H_2O + N_2O_3 \rightarrow HNO_2 + HNO_2$<br>WATER + NITROGEN OXIDE ($N_2O_3$)<br>75 ENG/CAR REACTION ORDER: 2<br>NOTE: EVALUATION | 313-323 | 3.1(+14) | 0 | 5133±1760 | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $H_2O + N_2O_4 \rightarrow HONO + HONO_2$ | | | | | | |
| WATER + NITROGEN OXIDE ($N_2O_4$) | | | | | | |
| 74 ENG/CER REACTION ORDER: 2 | 298-323 | 6.0(+14) | 0 | 6090±250 | 0.9 | 1.1 |
| $H_2O + N_2O_5 \rightarrow HONO_2 + HONO_2$ | | | | | | |
| WATER + NITROGEN OXIDE ($N_2O_5$) | | | | | | |
| 73 MOR/NIK2 REACTION ORDER: 2 | 298 | <7.8(+3) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $H_2O + C(^3P) \rightarrow$ products | | | | | | |
| WATER + CARBON ATOM | | | | | | |
| 75 HUS/YOU REACTION ORDER: 2 | 300 | <6.0(+11) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $H_2O + CH \rightarrow$ products | | | | | | |
| WATER + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 2.7(+13) | - | - | 0.9 | 1.2 |
| $H_2O_2 + O^*(^1D) \rightarrow HO_2 + OH$ | | | | | | |
| HYDROGEN PEROXIDE + OXYGEN ATOM | | | | | | |
| 76 FIE/HUS REACTION ORDER: 2 | 300 | 3.1(+14) | - | - | 0.9 | 1.1 |
| $H_2O_2 + O \rightarrow HO_2 + OH + H_2O + O_2$ | | | | | | |
| HYDROGEN PEROXIDE + OXYGEN ATOM | | | | | | |
| 71 AIB/HOY REACTION ORDER: 2 | 370-800 | 2.8(+13) | 0 | 3220±300 | | |
| 74 DAV/WON | 283-368 | 1.7(+12) | 0 | 2125±261 | 0.9 | 1.1 |
| $H_2O_2 + H \rightarrow HO_2 + H_2$ | | | | | | |
| HYDROGEN PEROXIDE + HYDROGEN ATOM | | | | | | |
| 74 GER/VOL REACTION ORDER: 2 | 298 | 1.9(+9) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| 76 GER | 298 | 2.4(+8) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| $H_2O_2 + D \rightarrow HO_2 + HD + HDO + OH$ | | | | | | |
| HYDROGEN PEROXIDE + DEUTERIUM ATOM | | | | | | |
| 71 AIB/HOY REACTION ORDER: 2 | 294-464 | 7.0(+12) | 0 | 2100±200 | | |
| $H_2O_2 + H \rightarrow H_2O + OH$ | | | | | | |
| HYDROGEN PEROXIDE + HYDROGEN ATOM | | | | | | |
| 72 GER/VOL REACTION ORDER: 2 $k/k_{ref}$: 2.0 | 298 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $H_2O_2 + H \rightarrow HO_2 + H_2$ (CORRECTED $k/k_{ref}$ RATIO) | | | | | | |
| 73 GER $k/k_{ref}$: 3.0 | 298 | - | - | - | | |
| NOTE: KEFF: $H_2O_2 + H \rightarrow HO_2 + H_2$ (EVALUATION) | | | | | | |
| | 298 | 7.2(+8) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| 74 GER/VOL $k/k_{ref}$: 1.86 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $H_2O_2 + H \rightarrow HO_2 + H_2$ | | | | | | |
| | 298 | 3.4(+9) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 75 KIJ/PAY | 283-353 | 3.1(+12) | 0 | 1400±140 | 0.6 | 1.4 |
| 75 MIA/HEI $k/k_{ref}$: 1.3 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H_2O_2 + H \rightarrow HO_2 + H_2$ | | | | | | |
| | 298 | 7.2(+11) | - | - | 0.7 | 1.3 |
| 72 GER/VOL | 298-669 | 4.6(+12) | 0 | 670±70 | 0.8 | 1.2 |
| 74 BAC/HOY2 | 298-670 | 4.8(+12) | 0 | 670±70 | 0.8 | 1.2 |
| 75 BAC/HOY | | | | | 0.9 | 1.1 |
| 75 MIA/HEI $k/k_{ref}$: 4.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| 76 GER | 298 | 7.5(+11) | - | - | 0.9 | 1.1 |
| $H_2O_2 + NO \rightarrow OH + HONO$ | | | | | | |
| HYDROGEN PEROXIDE + NITROGEN OXIDE (NO) | | | | | | |
| 72 GRA/LIS REACTION ORDER: 2 | 298 | <3.1(+4) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $H_2O_2 + NO_2 \rightarrow HONO_2 + 1/2H_2O + 1/4O_2$ (OVERALL) | | | | | | |
| HYDROGEN PEROXIDE + NITROGEN OXIDE ($NO_2$) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 72 GRA/LIS REACTION ORDER: 2 | 298 | <6.0(+5) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $H_2O_2 + M \rightarrow OH + OH + M$ | | | | | | |
| 71 TES/FOR REACTION ORDER: 2 | 717-754 | 3.2(+18) | 0 | 23553±650 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $S + O_2 \rightarrow SO + O$ | | | | | | |
| SULFUR ATOM + OXYGEN MOLECULE | | | | | | |
| 72 DAV/KLEI REACTION ORDER: 2 | 252-423 | 1.3(+12) | 0 | 0±50 | 0.9 | 1.1 |
| 72 DON/LIT | 295 | 1.0(+12) | - | - | 0.8 | 1.2 |
| 75 CIY/TOW | 298 | 9.0(+11) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $S + O_3 \rightarrow SO + O_2$ | | | | | | |
| SULFUR ATOM + OZONE | | | | | | |
| 75 CIY/TOW REACTION ORDER: 2 | 298 | 7.2(+12) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $S^*(^1D) + H_2 \rightarrow$ products | | | | | | |
| SULFUR ATOM + HYDROGEN MOLECULE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.22 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S^*(^1D) + N_2 \rightarrow$ products | | | | | | |
| SULFUR ATOM + NITROGEN MOLECULE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.062 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S^*(^1D) + NO \rightarrow$ products | | | | | | |
| SULFUR ATOM + NITROGEN OXIDE (NO) | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.68 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S + NO_2 \rightarrow SO + NO$ | | | | | | |
| SULFUR ATOM + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 75 CIY/TOW REACTION ORDER: 2 | 298 | 3.7(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $S^*(^1D) + N_2O \rightarrow NS + NO$ | | | | | | |
| SULFUR ATOM + NITROGEN OXIDE ($N_2O$) | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: ~0. | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S^*(^1D) + CO \rightarrow$ products | | | | | | |
| SULFUR ATOM + CARBON MONOXIDE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.19 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S^*(^1D) + CO_2 \rightarrow$ products | | | | | | |
| SULFUR ATOM + CARBON DIOXIDE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.24 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S^*(^1D) + CH_4 \rightarrow CH_3SH$ | | | | | | |
| SULFUR ATOM + METHANE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.076 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^* + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S + COS \rightarrow S_2 + CO$ | | | | | | |
| SULFUR ATOM + CARBON OXIDE SULFIDE | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 298 | 1.1(+10) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 74 KIE/DAV | 233-245 | 9.2(+11) | 0 | 1825±60 | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $S^*(^1D) + CeS \rightarrow S_2 + Cd$ | | | | | | |
| SULFUR ATOM + CARBON OXIDE SULFIDE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 1.5 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S + CH{\equiv}CH \rightarrow$ cy-CH=CHS | | | | | | |
| SULFUR ATOM + ETHYNE | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $K/k_{ref}$: 6.2exp(-1007/T) | | | | | | |
| $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| SULFUR ATOM + ETHENE | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 9.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 $k/k_{ref}$: 1.0 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| 72 DAV/KLE2 | 218-442 | 4.3(+12) | 0 | 795±40 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $S + CD_2{=}CH_2 \rightarrow$ cy-$CD_2CH_2S$ | | | | | | |
| SULFUR ATOM + ETHENE-1,1-$d_2$ | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 $k/k_{ref}$: 1.07 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| finis | | | | | | |
| ---------- | | | | | | |
| S + cis-CHD=CHD → cy-CHDCHDS | | | | | | |
| SULFUR ATOM + cis-ETHENE-1,2-$d_2$ | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 $k/k_{ref}$: 1.04 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S + CD_2{=}CD_2 \rightarrow$ cy-$CD_2CD_2S$ | | | | | | |
| SULFUR ATOM + ETHENE-$d_4$ | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 $k/k_{ref}$: 1.14 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S^*(^1D) + CH_3CH_3 \rightarrow$ products | | | | | | |
| SULFUR ATOM + ETHANE | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.17 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $S^*(^1D) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $S + cy\text{-}CH_2CH_2S \rightarrow S_2 + CH_2{=}CH_2$ | | | | | | |
| SULFUR ATOM + THIIRANE | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 6.3exp(+906/T); $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVINTIONAL PHOTOLYSIS METHOD | | | | | | |
| 73 KLI/DAVI | 298-355 | 2.7(+13) | 0 | 0 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $S + CH_3C{\equiv}CH \rightarrow$ cy-$(CH_3)C{=}CHS$ | | | | | | |
| SULFUR ATOM + 1-PROPYNE | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 6.2exp(-453/T); $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow$ cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S + CH_3CH{=}CH_2 \rightarrow$ cy-$(CH_3)CHCH_2S$ | | | | | | |
| SULFUR ATOM + PROPENE | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 6.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/0°C | 298-450 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: $k/k_{ref}$: 1.0exp(+574/T); $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| 73 KLE/DAV2 | 214-500 | 3.6(+12) | 0 | 190±45 | 0.2 | 5.2 |
| --- | | | | | | |
| S + cy-$(CH_2)CHCH_2S$ → $S_2$ + $CH_3CH{=}CH_2$ | | | | | | |
| SULFUR ATOM + THIIRANE, METHYL- | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 8.4exp(+1057/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| S + $CH_3C{\equiv}CCH_3$ → $CH{-}(CH_3)C{=}C(CH_3)S$ | | | | | | |
| SULFUR ATOM + 2-BUTYNE | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 2.7exp(+654/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| S + $CH_2{=}CHCH{=}CH_2$ → cy-$(CH_2{=}CH)CHCH_2S$ | | | | | | |
| SULFUR ATOM + 1,3-BUTADIENE | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 2.4exp(+1027/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| S + $CH_3CH_2CH{=}CH_2$ → cy-$(CH_3CH_2)CHCH_2S$ | | | | | | |
| SULFUR ATOM + 1-BUTENE | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 9.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/0°C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.75exp(+866/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| 73 KLE/DAV2 | 216-475 | 4.5(+12) | 0 | 180±45 | 0.1 | 14.0 |
| --- | | | | | | |
| S + cis-$CH_3CH{=}CHCH_3$ → cy-$(CH_3)CHCH(CH_3)S$ | | | | | | |
| SULFUR ATOM + cis-2-BUTENE | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.53exp(+1050/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| S + cis-$CH_3CH{=}CHCH_3$ → products | | | | | | |
| SULFUR ATOM + cis-2-BUTENE | | | | | | |
| 73 DAV/KLE REACTION ORDER: 2 | 219-500 | 2.8(+12) | 0 | -116±45 | 0.9 | 1.1 |
| --- | | | | | | |
| S + trans-$CH_3CH{=}CHCH_3$ → cy-$(CH_3)CHCH(CH_3)S$ | | | | | | |
| SULFUR ATOM + trans-2-BUTENE | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 1.2(+13) | - | - | 0.8 | 1.2 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/0°C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.65exp(+1010/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| S + $(CH_3)_2C{=}CH_2$ → cy-$[(CH_3)_2]CCH_2S$ | | | | | | |
| SULFUR ATOM + 1-PROPENE, 2-METHYL- | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 3.6(+13) | - | - | 0.9 | 1.1 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/0°C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.97exp(+1190/T) | | | | | | |
| $k_{ref}$: S + $CH_2{=}CH_2$ → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| S + $CH_3CH_2C(CH_3){=}CH_2$ → cy-$(CH_3CH_2)C(CH_3)CH_2S$ | | | | | | |
| SULFUR ATOM + 1-BUTENE, 2-METHYL- | | | | | | |
| 71 STR/0°C REACTION ORDER: 2 | 298-450 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: $k/k_{ref}$: 0.78exp(+1424/T) | | | | | | |
| $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S + CH_3CH{=}C(CH_3)_2 \rightarrow cy\text{-}(CH_3)CHC[(CH_3)_2]S$ | | | | | | |
| SULFUR ATOM + 2-BUTENE, 2-METHYL | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.51exp(+1515/T) | | | | | | |
| $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S + (CH_3)_2C{=}C(CH_3)_2 \rightarrow cy\text{-}[(CH_3)_2CC(CH_3)_2]S$ | | | | | | |
| SULFUR ATOM + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | >6.2(+13) | - | - | 0.9 | 1.1 |
| NOTE: LOWER LIMIT k. FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/O'C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.50exp(+1690/T) | | | | | | |
| $k_{ref}$: $S + CH_2{=}CH_2 \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $S + (CH_3)_2C{=}C(CH_3)_2 \rightarrow$ products | | | | | | |
| SULFUR ATOM + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 73 DAV/KLE REACTION ORDER: 2 | 252-500 | 2.8(+12) | 0 | -650±115 | 0.6 | 1.4 |
| ---------- | | | | | | |
| $S_2 + S_2 + M \rightarrow S_4 + M$ | | | | | | |
| SULFUR DIMER | | | | | | |
| 72 LAN/OLD REACTION ORDER: 3 M: $CO_2$ | 293 | 9.1(+17) | - | - | 0.1 | 10. |
| 73 LAN/OLD M: $CO_2$ | 293 | 3.6(+18) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| ---------- | | | | | | |
| $SO + O + M \rightarrow SO_2 + M$ | | | | | | |
| SULFUR MONOXIDE + OXYGEN ATOM | | | | | | |
| 71 MIY/TAK1 REACTION ORDER: 3 M: Ar | 298 | 7.3(+16) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $SO + O_3(v{=}n) \rightarrow SO_2^* + O_2$ | | | | | | |
| SULFUR MONOXIDE + OZONE | | | | | | |
| 74 KAL/BRA REACTION ORDER: 2 $k/k_{ref}$: 2.4 | 300 | - | - | - | 0.8 | 1.3 |
| NOTE: $k_{ref}$: $SO + O_3 \rightarrow SO_2^* + O_2$ | | | | | | |
| ---------- | | | | | | |
| $SO + SO \rightarrow SO_2 + S$ | | | | | | |
| SULFUR MONOXIDE | | | | | | |
| 75 CHU/CAL REACTION ORDER: 2 | 298 | 5.0(+8) | - | - | 0.2 | 1.8 |
| ---------- | | | | | | |
| $SO + SO_3 \rightarrow SO_2 + SO_2$ | | | | | | |
| SULFUR MONOXIDE + SULFUR TRIOXIDE | | | | | | |
| 75 CHU/CAL REACTION ORDER: 2 | 298 | 1.2(+9) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| $SO + NO_2 \rightarrow SO_2 + NO$ | | | | | | |
| SULFUR MONOXIDE + NITROGEN OXIDE($NO_2$) | | | | | | |
| 71 MIY/TAK2 REACTION ORDER: 2 | 298 | 1.2(+16) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $SO_2 + O + M \rightarrow SO_3 + M$ | | | | | | |
| SULFUR DIOXIDE + OXYGEN ATOM | | | | | | |
| 74 ATK/PIT3 REACTION ORDER: 3 M: $N_2O$ | 299-392 | 3.3(+16) | 0 | 1000±200 | | |
| 75 WES/DEH2 M: He | 297 | 3.0(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: He(1.0) M: $SO_2$ | 297 | 2.9(+15) | - | - | 0.7 | 1.3 |
| NOTE: M eff: $SO_2$(9.5) M: $N_2$ | 297 | 7.2(+14) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $N_2$(2.4) M: He | 248-415 | 3.9(+16) | 0 | 1400±50 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $SO_2 + O_2^*(^1\Delta_g) \rightarrow SO_3 + O$ | | | | | | |
| SULFUR DIOXIDE + OXYGEN MOLECULE | | | | | | |
| 76 DUM REACTION ORDER: 2 | 298 | 1.3(+8) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $SO_2 + O_3 \rightarrow SO_3 + O_2$ | | | | | | |
| SULFUR DIOXIDE + OZONE | | | | | | |
| 74 DAV/FRU REACTION ORDER: 2 | 300 | <6.0(+1) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $SO_2 + OH((v=9) \rightarrow HSO_3$ | | | | | | |
| SULFUR DIOXIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 WCF/COL REACTION ORDER: 2 | 298 | >1.4(+10) | - | - | 0.8 | 1.2 |
| NOTE: LOWER LIMIT k. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $SO_2 + OH + M \rightarrow HOSO_2 + M$ | | | | | | |
| SULFUR DIOXIDE + HYDROXYL FREE RADICAL | | | | | | |
| 74 CEX2 REACTION ORDER: 2 | 294 | 3.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION; RATE CONSTANT EXPRESSED AS k[M] M = 1 atm air | | | | | | |
| 75 CAS/DAV M: $N_2$ | 298 | 3.6(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k(760TORR) | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 298 | 5.8(+16) | - | - | | |
| NOTE: k(LOW PRESSURE: < 20TORR) | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 435 | 1.1(+12) | - | - | | |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 FAR/WAY REACTION ORDER: 3 M: Ar | 298 | 1.6(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 298 | 2.6(+14) | - | - | 0.6 | 1.4 |
| 76 ATK/PER3 REACTION ORDER: 2 M: Ar | 298 | 4.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: AT 760TORR M: Ar | 298 | 5.0(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: Ar | 298 | 5.9(+16) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| 77 CAS/TAN REACTION ORDER: 2 M: $N_2$ | 297 | 3.6(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k(760TORR) | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 297 | 5.8(+16) | - | - | | |
| NOTE: $k_0$(LOW-PRESSURE) | | | | | | |
| 3 M: $N_2$ | 253-297 | 5.0(+14) | 0 | -1410 | | |
| NOTE: k (LOW PRESSURE) ON THE BASIS OF k (297) AND Ea | 253-297 | 2.5(+29) | -5.1 | 0 | | |
| NOTE: k (LOW PRESSURE) (ALTERNATIVE T-DEPENDENT EXPRESSION) | | | | | | |
| ---------- | | | | | | |
| $SO_2 + HO_2 \rightarrow SO_3 + HO$ | | | | | | |
| SULFUR DIOXIDE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 FAY/SIL REACTION ORDER: 2 | 300 | 5.2(+8) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $SO_2 + SO_2^*(^1B_1) \rightarrow SO^*(^1\Delta_g, ^3\Sigma^-) + SO_3$ | | | | | | |
| SULFUR DIOXIDE | | | | | | |
| 75 CBU/CAL REACTION ORDER: 2 | 298 | 2.2(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $SO_2 + SO_2^*(^3B_1) \rightarrow SO^*(^3\Sigma^-) + SO_3$ | | | | | | |
| SULFUR DIOXIDE | | | | | | |
| 75 CBU/CAL REACTION ORDER: 2 | 298 | 4.2(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $SO_2 + NO_2 \rightarrow SO_3 + NO$ | | | | | | |
| SULFUR DIOXIDE + NITROGEN OXIDE($NO_2$) | | | | | | |
| 71 ARM/CUL REACTION ORDER: 2 | 703-1193 | 6.3(+12) | 0 | 13950 | | |
| 77 FRI/PAL | 430-1850 | 6.3(+12) | 0 | 16000 | | |
| NOTE: EXTENDED VALIDITY OF k REPORTED IN 71 ARM/CUL (ABOVE). | | | | | | |
| ---------- | | | | | | |
| $SO_2 + NO_3 \rightarrow SO_3 + NO_2$ | | | | | | |
| SULFUR DIOXIDE + NITROGEN OXIDE($NO_3$) | | | | | | |
| 75 DAU/CAL REACTION ORDER: 2 | 300 | <4.2(+3) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $SO_2 + N_2O_5 \rightarrow SO_3 + N_2O_4$ | | | | | | |
| SULFUR DIOXIDE + NITROGEN OXIDE($N_2O_5$) | | | | | | |
| 75 DAU/CAL REACTION ORDER: 2 | 300 | <2.5(+1) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $^1SO_2^* + CO \rightarrow SO + CO_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| SULFUR DIOXIDE + CARBON MONOXIDE<br>73 CEH/HEI REACTION ORDER: 2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $^1SO_2^*$ + $SO_2$ → products; $k/k_{ref}$ = 5.0 x $10^{-3}$ (2537 Å) | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $^1SO_2^*$ + $SO_2$ → products; $k/k_{ref}$ = 1.5 x $10^{-3}$ (3130 Å) | | | | | | |
| ---------- | | | | | | |
| $SO_2^*$ + CO → SO + $CO_2$<br>SULFUR DIOXIDE + CARBON MONOXIDE<br>73 CEH/HEI REACTION ORDER: 2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $SO_2^*$ → products; $k/k_{ref}$ = 2.2 x $10^{-5}$ (3130 TO 3261 Å) | | | | | | |
| ($SO_2^*$ IS A VIBRATIONALLY EXCITED SINGLET) | | | | | | |
| ---------- | | | | | | |
| $SO_2^{**}$ + CO → SO + $CO_2$<br>SULFUR DIOXIDE + CARBON MONOXIDE<br>73 CEH/HEI REACTION ORDER: 2 | 300 | - | - | - | 0.7 | 1.4 |
| NOTE: $k_{ref}$: $SO_2^{**}$ → $SO_2$; $k/k_{ref}$=1.8X$10^{-5}$ (2537 TO 3261 A) | | | | | | |
| ---------- | | | | | | |
| $SO_2$ + CO + M → products<br>SULFUR DIOXIDE + CARBON MONOXIDE<br>71 EAU/JEF REACTION ORDER: 2 M: Ar | 1770-2453 | 2.7(+12) | 0 | 24300±600 | 0.8 | 1.3 |
| NOTE: AT 27-170 TORR PRESSURE | | | | | | |
| ---------- | | | | | | |
| $SO_2$ + $CH_3$ + M → $CH_3SO_2$ + M<br>SULFUR DIOXIDE + METHYL FREE RADICAL<br>73 JAM/KER REACTION ORDER: 2 | 298 | 1.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| ---------- | | | | | | |
| $SO_2$ + CH≡CH → products<br>SULFUR DIOXIDE + ETHYNE<br>71 FIF/MCR REACTION ORDER: 2 | 1550-2150 | 3.2(+10) | 0.5 | 20535 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| ---------- | | | | | | |
| $SO_2^*(^3B_1)$ + cis-$CH_3CH$=$CHCH_3$ → [cis-$CH_3CH$=$CHCH_3$.$SO_2$]*<br>SULFUR DIOXIDE + cis-2-BUTENE<br>74 DEM/CAL REACTION ORDER: 2 | 294 | 1.3(+14) | - | - | 0.9 | 1.1 |
| 76 WAM | 295 | 6.3(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $SO_2^*(^3B_1)$ + trans-$CH_3CH$=$CHCH_3$ → [trans-$CH_3CH$=$CHCH_3$.$SO_2$]*<br>SULFUR DIOXIDE + trans-2-BUTENE<br>74 DEM/CAL REACTION ORDER: 2 | 294 | 1.2(+14) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $SO_2^*(^3B_1)$ + trans-$CH_3CH_2CH$=$CHCH_3$ → [$SO_2$.$CH_3CH_2CH$=$CHCH_3$]*<br>SULFUR DIOXIDE + trans-2-PENTENE<br>76 WAM REACTION ORDER: 2 | 295 | 1.0(+14) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $SO_3$ + O → $SO_2$ + $O_2$<br>SULFUR TRIOXIDE + OXYGEN ATOM<br>71 MEK/LEV REACTION ORDER: 2 | 1100-1400 | 6.5(+14) | 0 | 5435 | | |
| NOTE: k DETERMINED IN $H_2S$ FLAME | 900-1600 | 2.8(+14) | 0 | 6040 | | |
| NOTE: k DETERMINED IN COS FLAME<br>72 JAC/WIN | 300-500 | 1.5(+8) | 0 | 500 | | |
| ---------- | | | | | | |
| $SO_3$ + O + M → $SO_2$ + $O_2$ + M<br>SULFUR TRIOXIDE + OXYGEN ATOM<br>75 WES/DEH1 REACTION ORDER: 3 M: HE | 298 | 7.3(+17) | - | - | 0.9 | 1.1 |
| NOTE:M eff: He(1.0) M: $SO_3$ | 298 | <7.3(+18) | - | - | | |
| NOTE:M eff: $SO_3$(<10.0) UPPER LIMIT RATIO M: $N_2$ | 298 | 1.0(+18) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $N_2$(1.4) M: He | 298-507 | 5.0(+16) | 0 | -785 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $SO_3$ + $H_2O$ → $H_2SO_4$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| SULFUR TRIOXIDE + WATER | | | | | | |
| 75 CAS/DAV REACTION ORDER: 2 | 298 | 5.5(+11) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $SO_3 + SO \rightarrow SO_2 + SO_2$ | | | | | | |
| SULFUR TRIOXIDE + SULFUR MONOXIDE | | | | | | |
| 75 CHU/CAL REACTION ORDER: 2 | 298 | 1.2(+9) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| $SO_3 + N \rightarrow SO_2 + NO$ | | | | | | |
| SULFUR TRIOXIDE + NITROGEN ATOM | | | | | | |
| 72 JAC/WIN REACTION ORDER: 2 | 300 | 3.0(+8) | - | - | | |
| 75 WES/DEH1 | 298 | <6.0(+6) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $S_2O + O \rightarrow SO + SO$ | | | | | | |
| SULFUR OXIDE($S_2O$) + OXYGEN ATOM | | | | | | |
| 74 STE/ALV REACTION ORDER: 2 | 298 | 9.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $SH + O \rightarrow SO + H$ | | | | | | |
| MERCAPTO FREE RADICAL + OXYGEN ATOM | | | | | | |
| 75 CUP/GLA REACTION ORDER: 2 | 295 | 9.6(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $SH + H \rightarrow S + H_2$ | | | | | | |
| MERCAPTO FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 72 LAN/OLD REACTION ORDER: 2 | 293 | 6.0(+12) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 73 BRA/TRU | 298 | 2.5(+13) | - | - | | |
| 75 CUP/GLA | 295 | 1.5(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $SH + SH \rightarrow H_2S + S$ | | | | | | |
| MERCAPTO FREE RADICAL | | | | | | |
| 72 LAN/OLD REACTION ORDER: 2 | 293 | 1.8(+13) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 73 BRA/TRU | 298 | 7.8(+12) | - | - | | |
| ---------- | | | | | | |
| $SH + NO \rightarrow$ products | | | | | | |
| MERCAPTO FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 73 BRA/TRU REACTION ORDER: 2 | 298 | 6.3(+11) | - | - | | |
| ---------- | | | | | | |
| $H_2S + O \rightarrow SH + OH$ | | | | | | |
| HYDROGEN SULFIDE + OXYGEN ATOM | | | | | | |
| 76 WEY/TIM REACTION ORDER: 2 | 263-495 | 4.4(+12) | 0 | 1660±50 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $D_2S + O \rightarrow SD + OD$ | | | | | | |
| HYDROGEN SULFIDE($D_2S$) + OXYGEN ATOM | | | | | | |
| 76 WEY/TIM REACTION ORDER: 2 | 298-450 | 6.3(+12) | 0 | 2145±155 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $H_2S + O_3 \rightarrow SO_2 + H_2O$ | | | | | | |
| HYDROGEN SULFIDE + OZONE | | | | | | |
| 75 BEC/INO REACTION ORDER: 2 | 298 | <1.2(+4) | - | - | | |
| NOTE: UPPER LIMIT k. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $H_2S + O_3 \rightarrow SO_2 + H_2O$ | | | | | | |
| HYDROGEN SULFIDE + OZONE | | | | | | |
| 75 GLA/TOB1 REACTION ORDER: 2 | 293-343 | 4.9(+10) | 0 | 3420 | | |
| NOTE: ESTIMATE | | | | | | |
| 75 GLA/TOB2 | 298-343 | 1.6(+12) | 0 | 2620±600 | 0.2 | 6.3 |
| ---------- | | | | | | |
| $H_2S + H \rightarrow SH + H_2$ | | | | | | |
| HYDROGEN SULFIDE + HYDROGEN ATOM | | | | | | |
| 71 KUR/PET REACTION ORDER: 2 | 190-464 | 7.8(+12) | 0 | 860±30 | 0.9 | 1.1 |
| 72 KOM/SCH | 298 | 2.3(+11) | - | - | 0.8 | 1.3 |
| 73 BRA/TRU | 298 | 5.0(+11) | - | - | | |
| ---------- | | | | | | |
| $H_2S + OH \rightarrow SH + H_2O$ | | | | | | |
| HYDROGEN SULFIDE + HYDROXYL FREE RADICAL | | | | | | |
| 73 WES/DEH3 REACTION ORDER: 2 | 298-885 | 1.4(+13) | 0 | 443 | | |
| 74 STU | 298 | 1.8 | - | - | 0.8 | 1.2 |
| 76 PER/ATK1 | 297-427 | 3.1(+12) | 0 | 0 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $H_2S + OH \rightarrow$ products (OVERALL) | | | | | | |
| HYDROGEN SULFIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 NIK/MOR1 REACTION ORDER: 2 | 300 | 5.2(+12) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: APPROXIMATE k | | | | | | |
| $H_2S$ + OH(v=9) → products | | | | | | |
| HYDROGEN SULFIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | >1.5(+11) | - | - | 0.6 | 1.4 |
| NOTE: LOWER LIMIT k. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| $H_2S$ + M → SH + H + M | | | | | | |
| HYDROGEN SULFIDE | | | | | | |
| 76 PIG/SAI REACTION ORDER: 2 M: Ar | 2380-3000 | 1.3(+16) | 0 | 46300 | | |
| 77 BOW/DOD M: Ar | 2700-3800 | 2.0(+13) | 0 | 3700±960 | 0.7 | 1.5 |
| N + O → NO*(C,v=0) | | | | | | |
| NITROGEN ATOM + OXYGEN ATOM | | | | | | |
| 73 MAN/CAR REACTION ORDER: 2 | 300 | 1.7(+6) | - | - | 0.8 | 1.2 |
| N + O + M → NO + M | | | | | | |
| NITROGEN ATOM + OXYGEN ATOM | | | | | | |
| 73 CAM/GRA REACTION ORDER: 3 M: $N_2$ | 196-298 | 2.0(+15) | 0 | -155 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES k(196)=(4.38±0.38)X$10^9$ AND k(298) = (3.34±0.36) x $10^9 dm^6 mol^{-2} s^{-1}$ | | | | | | |
| $N^*(2D)$ + $O_2$ → NO + O | | | | | | |
| NITROGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 71 SIA/WOO REACTION ORDER: 2 | 237-365 | 2.7(+11) | 0.5 | 0 | 0.8 | 1.2 |
| 72 BUS/KIR2 | 300 | 5.6(+12) | - | - | 0.8 | 1.2 |
| $N^*(^2D)$ + $O_2$ → products | | | | | | |
| NITROGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 71 LIN/FAU REACTION ORDER: 2 | 300 | 3.7(+12) | - | - | 0.7 | 1.3 |
| $N^*(^2P)$ + $O_2$ → NO + O | | | | | | |
| NITROGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 72 BUS/KIR2 REACTION ORDER: 2 | 300 | 2.8(+12) | - | - | 0.4 | 1.6 |
| N + $O_2^*(^1\Delta_g)$ → NO + O | | | | | | |
| NITROGEN ATOM + OXYGEN MOLECULE | | | | | | |
| 73 SCH/SCH2 REACTION ORDER: 2 | 300 | 1.3(+9) | - | - | 0.7 | 1.3 |
| N + H + M → NH + M | | | | | | |
| NITROGEN ATOM + HYDROGEN ATOM | | | | | | |
| 73 DEO REACTION ORDER: 3 | 298 | 1.8(+16) | - | - | 0.4 | 1.6 |
| NOTE: k CENTRAL VALUE OBTAINED BY AVERAGING k<(6.4±1.5) x $10^{-32}$ AND k>(3.1±1.0) x $10^{-32} cm^6 molecule^{-2} s^{-1}$. M = $N_2$, He | | | | | | |
| $N^*(^2D)$ + $H_2$ → products | | | | | | |
| NITROGEN ATOM + HYDROGEN MOLECULE | | | | | | |
| 72 BUS/KIR2 REACTION ORDER: 2 | 300 | 1.0(+12) | - | - | 0.7 | 1.3 |
| N + $SO_3$ → NO + $SO_2$ | | | | | | |
| NITROGEN ATOM + SULFUR TRIOXIDE | | | | | | |
| 72 JAC/WIN REACTION ORDER: 2 | 300 | 3.0(+8) | - | - | | |
| 75 WES/DEH1 | 298 | <6.0(+6) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| N + NO → $N_2$ + O | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in $^{o}K$) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NITROGEN ATOM + NITROGEN OXIDE (NO)<br>75 CLY/MCD REACTION ORDER: 2 | 298-670 | 4.9(+13) | 0 | 410±120 | 0.8 | 1.2 |
| $N^*(^2D) + NO \rightarrow$ products<br>NITROGEN ATOM + NITROGEN OXIDE (NO)<br>72 HUS/KIR2 REACTION ORDER: 2 | 300 | 3.7(+13) | - | - | 0.4 | 1.6 |
| $N^*(^2P) + NO \rightarrow$ products<br>NITROGEN ATOM + NITROGEN OXIDE (NO)<br>72 HUS/KIR2 REACTION ORDER: 2 | 300 | 2.0(+13) | - | - | 0.7 | 1.3 |
| $N + NO_2 \rightarrow O + N_2O$<br>NITROGEN ATOM + NITROGEN OXIDE($NO_2$)<br>75 CLY/MCD REACTION ORDER: 2 | 298 | 8.4(+11) | - | - | 0.9 | 1.1 |
| $N^*(^2D) + N_2O \rightarrow N_2 + NO$<br>NITROGEN ATOM + NITROGEN OXIDE ($N_2O$)<br>71 SIA/WOO REACTION ORDER: 2 | 237-365 | 2.2(+11) | 0.5 | 400 | 0.9 | 1.1 |
| 72 HUS/KIR2 | 300 | 2.9(+12) | - | - | 0.8 | 1.2 |
| $N^*(^2P) + N_2O \rightarrow N_2 + NO$<br>NITROGEN ATOM + NITROGEN OXIDE ($N_2O$)<br>72 HUS/KIR2 REACTION ORDER: 2 | 300 | 2.0(+12) | - | - | 0.6 | 1.4 |
| $N^*(^2D) + N_2O \rightarrow$ products<br>NITROGEN ATOM + NITROGEN OXIDE ($N_2O$)<br>71 LIN/KAU REACTION ORDER: 2 | 300 | 2.1(+12) | - | - | 0.7 | 1.3 |
| $N + HN_3 \rightarrow N_2 + N_2H$<br>NITROGEN ATOM + HYDRAZOIC ACID<br>73 LEE/COM REACTION ORDER: 2 | 298 | 3.0(+9) | - | - | | |
| $N + NH_2NH_2 \rightarrow NH + NH_2NH$<br>NITROGEN ATOM + HYDRAZINE<br>75 YE REACTION ORDER: 2 | 298 | 2.7(+10) | - | - | | |
| $N + NH_2NH_2 \rightarrow$ products<br>NITROGEN ATOM + HYDRAZINE<br>75 YE REACTION ORDER: 2 | 298-379 | 3.1(+12) | 0 | 1158 | | |
| $N + C + M \rightarrow CN^*(B) + M$<br>NITROGEN ATOM + CARBON ATOM<br>75 WAS/KLE REACTION ORDER: 3 M: Ar | 298 | 3.8(+15) | - | - | 0.7 | 1.3 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| $N^*(^2D) + CO_2 \rightarrow$ products<br>NITROGEN ATOM + CARBON DIOXIDE<br>71 LIN/KAU REACTION ORDER: 2 | 300 | 3.0(+11) | - | - | 0.6 | 1.4 |
| $N + HCHO \rightarrow$ products<br>NITROGEN ATOM + FORMALDEHYDE<br>71 WBI REACTION ORDER: 2 | 323-643 | 2.6(+12) | 0 | 1810±300 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| $N + CN \rightarrow N_2 + C$ | | | | | | |
| NITROGEN ATOM + CYANOGEN FREE RADICAL | | | | | | |
| 76 SLA REACTION ORDER: 2 | 5000-8000 | 4.4(+14) | 0 | 4530 | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $N + NCC{\equiv}CCN \rightarrow [N.C_4N_2^{\#}]$ | | | | | | |
| NITROGEN ATOM + 2-BUTYNEDINITRILE | | | | | | |
| 76 HAN/OBE REACTION ORDER: 2 | 300 | 3.2(+9) | - | - | 0.2 | 1.8 |
| --- | | | | | | |
| $N_2 + O \rightarrow N + NO$ | | | | | | |
| NITROGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 73 EAC/EBE REACTION ORDER: 2 | 1900-2250 | 5.0(+13) | 0 | 37950 | 0.5 | 2.0 |
| 73 IVE/BAS | 1900-2400 | 1.3(+14) | 0 | 37950 | | |
| NOTE: EVALUATION | | | | | | |
| 76 HAR/NAS | 2270-2620 | 9.1(+13) | 0 | 38000 | 0.9 | 1.1 |
| 77 BIA/SME | 1880-2350 | 7.5(+13) | 0 | 38250 | 0.8 | 1.2 |
| 77 MCN/HAN2 | 2384-3850 | 1.8(+14) | 0 | 38375 | 0.7 | 1.4 |
| --- | | | | | | |
| $N_2 + O \rightarrow N_2O$ | | | | | | |
| NITROGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 1.0(+12) | - | - | | |
| NOTE: GIVEN WITH CAUTION. RATE CONSTANT EXPRESSED AS: | | | | | | |
| $k = [N_2]\ 1.0 \times 10^{12} cm^6 mol^{-2} s^{-1}$ | | | | | | |
| --- | | | | | | |
| $N_2 + O^*(^1D) \rightarrow$ products | | | | | | |
| NITROGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 73 HEI/HUS1 REACTION ORDER: 2 | 300 | 4.2(+13) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 1.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $N_2 + O + M \rightarrow N_2O + M$ | | | | | | |
| NITROGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 71 STU/NIK1 REACTION ORDER: 3 M: $N_2$ | 300 | <1.8(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $N_2 + O^*(^1D) + M \rightarrow N_2O + M$ | | | | | | |
| NITROGEN MOLECULE + OXYGEN ATOM | | | | | | |
| 72 SIM/LIS REACTION ORDER: 3 $k/k_{ref}$: <0.04 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2 + O^*(^1D) \rightarrow N_2 + O$ (RATIO IN $cm^3 mol^{-1}$ UNITS) | | | | | | |
| --- | | | | | | |
| $N_2 + OH \rightarrow N_2O + H$ | | | | | | |
| NITROGEN MOLECULE + HYDROXYL FREE RADICAL | | | | | | |
| 75 ALE/ROY REACTION ORDER: 2 | 700-1100 | 3.2(+12) | 0 | 40510 | | |
| NOTE: EVALUATION BASED ON $k_{-1}$ AND THERMODYNAMIC DATA | | | | | | |
| --- | | | | | | |
| $N_2 + OH(v=9) \rightarrow$ products | | | | | | |
| NITROGEN MOLECULE + HYDROXYL FREE RADICAL | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 2.2(+9) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| $N_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| NITROGEN MOLECULE + SULFUR ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.062 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $N_2 + CH \rightarrow$ products | | | | | | |
| NITROGEN MOLECULE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 6.1(+11) | - | - | 0.5 | 1.2 |
| --- | | | | | | |
| $N_2 + M \rightarrow N + N + M$ | | | | | | |
| NITROGEN MOLECULE | | | | | | |
| 74 KEW/HOR REACTION ORDER: 2 M: N | 6000-14000 | 8.5(+25) | -2.5 | 56970 | 0.6 | 1.6 |
| M: $N_2$ | 6000-14000 | 2.3(+29) | -3.5 | 56970 | 0.6 | 1.6 |
| --- | | | | | | |
| $NO + O \rightarrow N + O_2$ | | | | | | |
| NITROGEN OXIDE (NO) + OXYGEN ATOM | | | | | | |
| 74 HAN/FLO REACTION ORDER: 2 | 2500-4100 | 2.4(+9) | 1 | 19446 | | |
| | 1700-2300 | 1.7(+9) | 0 | 19447 | 0.8 | 1.3 |
| | 1500-5000 | 3.7(+9) | 1.0 | 20850 | | |
| NOTE: RECOMMENDED k | | | | | | |
| --- | | | | | | |
| $NO + O^*(^1D) \rightarrow N + O_2$ | | | | | | |
| NITROGEN OXIDE (NO) + OXYGEN ATOM | | | | | | |
| 73 HEI/HUS2 REACTION ORDER: 2 | 300 | 5.1(+13) | - | - | 0.9 | 1.1 |
| 73 HEI/HUS2 $k/k_{ref}$: 0.43 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $NO + O + M \rightarrow NO_2 + M$ | | | | | | |
| NITROGEN OXIDE (NO) + OXYGEN ATOM | | | | | | |
| 71 ATK/CVE REACTION ORDER: 3 M: $N_2O$ | 298 | 3.7(+16) | - | - | 0.8 | 1.2 |
| 71 STU/NIK1 M: He | 300 | 2.4(+16) | - | - | 0.9 | 1.1 |
| 71 STU/NIK1 M: NO | 300 | 5.4(+16) | - | - | 0.9 | 1.1 |
| 72 ATK/CVE M: $N_2O$ | 298-473 | 2.6(+15) | 0 | -805±150 | 0.8 | 1.2 |
| 73 GAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 8.0(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 74 ATK/PIT1 M: $N_2O$ | 300-392 | 9.6(+15) | 0 | -450±100 | | |
| 74 ATK/PIT2 M: $N_2O$ | 300 | 4.3(+16) | - | - | 0.9 | 1.1 |
| 74 FUR/ATK M: $N_2O$ | 298 | 5.8(+16) | - | - | 0.9 | 1.1 |
| 75 CAM/HAN2 M: Ar | 285-432 | 1.1(+15) | 0 | -900±85 | 0.7 | 1.3 |
| NOTE: M eff: Ar(1.0) | | | | | | |
| M: $N_2$ | 285-432 | 1.8(+15) | 0 | -900±85 | 0.7 | 1.3 |
| NOTE: M eff: $N_2$(1.62±0.14) | | | | | | |
| 75 GAE/TRO REACTION ORDER: 2 M: $N_2$ | 296 | 1.8(+13 | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 75 EIF/SCH M: $N_2$ | 295 | 1.8(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k (REEVALUATION) | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 295 | 2.7(+16) | - | - | 0.8 | 1.2 |
| NOTE: M eff: $N_2$(1.0) LIMITING LOW-PRESSURE k (REEVALUATION) | | | | | | |
| 75 SIN/FUR M: $N_2O$ | 298-473 | 6.1(+15) | 0 | -620±28 | 0.9 | 1.1 |
| 76 MIC/PAY M: He | 217-500 | 3.9(+15) | 0 | -523±30 | 0.9 | 1.1 |
| NOTE: M eff: (He):0.87(217K); 0.95(298K); 1.0(500K) | | | | | | |
| M: Ne | 217-500 | 3.4(+15) | 0 | -518±30 | 0.9 | 1.1 |
| NOTE: M eff(Ne): 3.74(217K); 0.8(298K); 0.9(500K) | | | | | | |
| M: Ar | 217-500 | 3.3(+15) | 0 | -594±35 | 0.9 | 1.1 |
| NOTE: M eff(Ar): 1.0(217-500K) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| M: Kr | 217-500 | 3.5(+15) | 0 | -574±35 | 0.9 | 1.1 |
| NOTE: M eff(Kr): 0.97(217K)[0.99(298K) 1.0(500K) | | | | | | |
| 76 WRY/MIC1 — M: $N_2$ | 217-500 | 5.6(+15) | 0 | -584±35 | 0.9 | 1.1 |
| M: $N_2$ | 217-500 | 1.4(+21) | -1.82 | 0 | | |
| NOTE: ALTERNATIVE T-DEPENDENT k | | | | | | |
| 77 AZK/PER1 — M: Ar | 298-439 | 5.3(+15) | 0 | -473±100 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO + O_2^*(^1\Delta_g) \rightarrow NO_2 + O$ | | | | | | |
| NITROGEN OXIDE (NO) + OXYGEN MOLECULE | | | | | | |
| 76 DUM — REACTION ORDER: 2 | 298 | 2.9(+6) | - | - | | |
| ---------- | | | | | | |
| $NO + O_3 \rightarrow NO_2 + O_2$ | | | | | | |
| NITROGEN OXIDE (NO) + OZONE | | | | | | |
| 73 GBO/ELL — REACTION ORDER: 2 | 298 | 8.5(+9) | - | - | 0.9 | 1.1 |
| 73 STE/NIK1 | 298 | 1.0(+10) | - | - | 0.9 | 1.1 |
| 74 BEC/SCH | 290 | 1.0(+10) | - | - | | |
| 74 BEM/CLY | 298 | 1.1(+10) | - | - | 0.9 | 1.1 |
| 76 BIK/SHO | 203-361 | 1.4(+12) | 0 | 1450±50 | 0.9 | 1.1 |
| 76 FKE/STE | 298 | 1.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: INCLUDES $O_3(001)$. | | | | | | |
| ---------- | | | | | | |
| $NO + O_3(v=1,2) \rightarrow NO_2 + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 75 KUR/BRA — REACTION ORDER: 2 | 153-373 | 1.2(+13) | 0 | 1525 | | |
| ---------- | | | | | | |
| $NO + O_3(001) \rightarrow NO_2 + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 76 GER/LIN — REACTION ORDER: 2 | 308 | 5.4(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO + O_3(v=n) \rightarrow NO_2(v=n) + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 73 GER/LIN — REACTION ORDER: 2 | 350 | 1.5(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO + O_3(v=n) \rightarrow NO_2^* + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 74 BRA/KUR — REACTION ORDER: 2 $k/k_{ref}$: 5.6 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2^* + O_2$ | | | | | | |
| ---------- | | | | | | |
| $NO + O_3^\ddagger \rightarrow NO_2^\ddagger(^2A_1) + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 74 KUR/BRA — REACTION ORDER: 2 $k/k_{ref}$: 17.1 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2^\ddagger(^2A_1) + O_2$ | | | | | | |
| ---------- | | | | | | |
| $NO + O_3(001) \rightarrow NO_2^* + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 76 GER/LIN — REACTION ORDER: 2 | 308 | 4.3(+9) | - | - | 0.8 | 1.2 |
| 77 MEY/BAR — $k/k_{ref}$: 7.6 | 300 | - | - | - | 0.7 | 1.2 |
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2^* + O_2$ | | | | | | |
| ---------- | | | | | | |
| $NO + O_3^\ddagger \rightarrow NO_2^\ddagger(^2A_1) + NO_2^*(2B1) + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 74 KUR/BRA — REACTION ORDER: 2 $k/k_{ref}$: 16.2 | 300 | - | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2^*(^2A_1) + NO_2^*(2B1) + O_2$ | | | | | | |
| 74 KUR/BRA | 300 | 1.6(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO + O_3^* \rightarrow NO_2^*(2B1) + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 74 KUR/BRA REACTION ORDER: 2 $k/k_{ref}$: 4.1 | 300 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2^*(2B1) + O_2$ | | | | | | |
| ---------- | | | | | | |
| $NO(v=1) + O_3 \rightarrow NO_2^*(2B1) + O_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 76 STE/FRE REACTION ORDER: 2 $k/k_{ref}$: 5.7 | 298 | - | - | - | 0.8 | 1.5 |
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2^*(2B1) + O_2$ | | | | | | |
| ---------- | | | | | | |
| $NO(v=n) + O_3 \rightarrow$ products | | | | | | |
| NITROGEN OXIDE(NO) + OZONE | | | | | | |
| 76 STE/FRE REACTION ORDER: 2 $k/k_{ref}$: ≤22 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $NO + O_3 \rightarrow NO_2(2A1) + O_2$ (UPPER LIMIT RATIO) | | | | | | |
| ---------- | | | | | | |
| $NO + H \rightarrow OH + N$ | | | | | | |
| NITROGEN OXIDE(NO) + HYDROGEN ATOM | | | | | | |
| 75 BEA/CRA REACTION ORDER: 2 | 2530-3020 | 3.5(+14) | 0 | 23940 | | |
| 75 DUX/PRA | 2200-3250 | 2.6(+14) | 0 | 24560 | | |
| 75 FIO/HAN | 2400-4500 | 1.3(+14) | 0 | 24760±400 | 0.9 | 1.1 |
| 75 KOS/AND | 2000-4000 | 3.2(+13) | 0 | 24160±150 | 0.5 | 2.0 |
| 76 AND/ASA | 2300-3500 | 5.0(+13) | 0 | 24510 | 0.7 | 1.4 |
| NOTE: REEVALUATION | | | | | | |
| 76 FIO | 2400-4200 | 2.2(+14) | 0 | 25415 | 0.8 | 1.2 |
| 76 MCC/KRU | 1750-2040 | 1.7(+14) | 0 | 24760 | 0.6 | 1.6 |
| | 1700-4300 | 1.3(+14) | 0 | 24077 | | |
| NOTE: RECOMMENDED k | | | | | | |
| 77 FIO/HAN | 2400-4200 | 2.2(+14) | 0 | 25400±300 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NO + H + M \rightleftharpoons HNO + M$ | | | | | | |
| NITROGEN OXIDE(NO) + HYDROGEN ATOM | | | | | | |
| 71 BIK/EYR REACTION ORDER: 3 M: $H_2$ | 298 | 1.4(+16) | - | - | 0.9 | 1.1 |
| 71 ESB M: $H_2$ | 298 | 2.3(+16) | - | - | | |
| M: He | 298 | 1.5(+16) | - | - | | |
| M: Ne | 298 | 7.9(+15) | - | - | | |
| M: Ar | 298 | 1.4(+16) | - | - | | |
| M: Kr | 298 | 2.0(+16) | - | - | | |
| 72 ABU/MIC M: $H_2$ | 298 | 2.6(+16) | - | - | 0.9 | 1.1 |
| NOTE:M eff: $H_2$(1.6) | | | | | | |
| M: He | 298 | 1.6(+16) | - | - | 0.9 | 1.1 |
| NOTE:M eff: He(1.1) | | | | | | |
| M: Ne | 298 | 7.6(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: NE(0.5) | | | | | | |
| M: Ar | 298 | 1.4(+16) | - | - | 0.9 | 1.1 |
| NOTE:M eff: Ar(1.0) | | | | | | |
| M: Kr | 298 | 2.0(+16) | - | - | 0.9 | 1.1 |
| NOTE:M eff: Kr(1.4) | | | | | | |
| 75 CAM/HAN2 M: Ar | 392 | 8.7(+15) | - | - | 0.9 | 1.1 |
| NOTE:M eff: Ar(1.0) | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| M: $N_2$ | 392 | 1.4(+16) | - | - | 0.9 | 1.1 |
| NOTE: M eff: $N_2$(1.64±0.12) | | | | | | |
| 77 OKA/SIN M: $H_2$ | 298 | 1.6(+16) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| NO + $H_2$ → HNO + H | | | | | | |
| NITROGEN OXIDE(NO) + HYDROGEN MOLECULE | | | | | | |
| 75 KOS/AND REACTION ORDER: 2 | 2000-4000 | 4.0(+13) | 0 | 29040 | | |
| 76 AND/ASA | 2300-3500 | 3.2(+13) | 0 | 27780 | 0.7 | 1.4 |
| NOTE: REEVALUATION | | | | | | |
| --- | | | | | | |
| NO + OH(v=0) → HONO | | | | | | |
| NITROGEN OXIDE(NO) + HYDROXYL FREE RADICAL | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 9.0(+10) | - | - | 0.8 | 1.2 |
| NOTE: UNREFORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| NO + OH + M → HONO + M | | | | | | |
| NITROGEN OXIDE(NO) + HYDROXYL FREE RADICAL | | | | | | |
| 72 AND/KAU REACTION ORDER: 3 M: Ar | 297 | 1.5(+17) | - | - | 0.5 | 1.5 |
| NOTE: AT 5 TORR | | | | | | |
| REACTION ORDER: 3 M: Ar | 297 | 9.1(+16) | - | - | 0.6 | 1.4 |
| NOTE: AT 8 TORR | | | | | | |
| 72 STU/NIK2 REACTION ORDER: 2 M: He | 300 | 1.2(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 73 MER/SMI REACTION ORDER: 3 M: He | 300-416 | 1.0(+16) | 0 | -810±240 | 0.8 | 1.2 |
| 72 WES/DEH4 REACTION ORDER: 3 | 273-395 | 4.7(+17) | - | - | | |
| NOTE: k DECREASING WITHIN GIVEN T RANGE FROM $4.7 \times 10^{17}$ TO $1.3 \times 10^{17}$ $cm^6 mol^{-2} s^{-1}$ | | | | | | |
| M: Ar | 298 | 1.3(+17) | - | - | | |
| 74 AND/MAR | 295 | 1.2(+17) | - | - | 0.8 | 1.2 |
| NOTE: A NEGATIVE ACTIVATION ENERGY OF -1700±300 CAL/MOL (OR E/R=-856±150) WAS DETERMINED IN THE T-RANGE 295-439K. | | | | | | |
| --- | | | | | | |
| 74 AND/MAR M: Ar | 295 | 1.2(+17) | - | - | 0.8 | 1.2 |
| M: Ar | 295 | 2.1(+17) | - | - | 0.8 | 1.2 |
| 74 COX2 REACTION ORDER: 2 | 294 | 3.7(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION. RATE CONSTANT EXPRESSED AS K[M] WITH M=$N_2$ + $O_2$ AT 1 ATM | | | | | | |
| 74 HOW/EVE REACTION ORDER: 3 M: He | 296 | 1.5(+17) | - | - | | |
| M: Ar | 296 | 1.6(+17) | - | - | | |
| M: $N_2$ | 296 | 2.8(+17) | - | - | | |
| 75 ATF/HAN1 REACTION ORDER: 2 M: Ar | 298 | 3.1(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: Ar | 298 | 1.5(+17) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k | | | | | | |
| REACTION ORDER: 2 M: $N_2$ | 298 | 3.7(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 298 | 2.2(+17) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k | | | | | | |
| 75 GEF/MUL1 REACTION ORDER: 2 | 435 | 4.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 BAR/WAY REACTION ORDER: 3 M: Ar | 298 | 2.5(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 298 | 5.4(+17) | - | - | 0.7 | 1.3 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 COX/DER1 REACTION ORDER: 2 $k/k_{ref}$: 1630 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $H_2 + OH \rightarrow H + H_2O$; $M = N_2 + O_2$ | | | | | | |
| NOTE: EVALUATION; $M = N_2 + O_2$ | 298 | 7.0(+12) | - | - | 0.9 | 1.1 |
| 76 OVE/PAR | 295 | 1.1(+13) | - | - | | |
| NOTE: LIMITING HIGH. PRESSURE k; $M = H_2O, CF_4, SF_6, N_2, Ar$, OR He | | | | | | |
| M: He | 295 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 777 TORR | | | | | | |
| M: Ar | 295 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 720 TORR | | | | | | |
| M: $SF_6$ | 295 | 7.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 770 TORR | | | | | | |
| M: $N_2$ | 295 | 4.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 770 TORR | | | | | | |
| M: $CF_4$ | 295 | 8.4(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 710 TORR | | | | | | |
| 76 SIE/SIM2 M: $H_2$ | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ (CONSTANT RATIO FOR 408-768 TORR PRESSURE RANGE, DECREASING TO 16.1 AT 96 TORR) | | | | | | |
| M: $H_2$ | 298 | 7.2(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION) | | | | | | |
| 76 SIM/HEI M: $H_2$ | 296 | 2.2(+12) | - | - | | |
| NOTE: AT ~100 TORR (EVALUATION) | | | | | | |
| 76 SIM/HEI REACTION ORDER: 2 | 296 | 6.6(+12) | - | - | | |
| NOTE: AT ~730 TORR (EVALUATION) | | | | | | |
| --- | | | | | | |
| $NO + HO_2 \rightarrow NO_2 + OH$ | | | | | | |
| NITROGEN OXIDE(NO) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 76 PAY/STI REACTION ORDER: 2 | 300 | 1.8(+11) | - | - | 0.3 | 3.0 |
| NOTE: EVALUATION | | | | | | |
| 73 SIM/HEI1 REACTION ORDER: 2 | 298 | >9.0(+10) | - | - | | |
| NOTE: EVALUATION. LOWER LIMIT K | | | | | | |
| 74 BAC/HOY2 | 298-669 | 2.0(+13) | 0 | 1430 | 0.5 | 1.5 |
| 74 SIM/HEI2 $k/k_{ref}$: 7.0 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $NO_2 + HO_2 \rightarrow O_2 + HONO$ | | | | | | |
| 75 COX | 300 | 7.2(+11) | - | - | 0.7 | 1.3 |
| 75 GIA/TRO | 1350-1700 | 4.5(+12) | - | - | 0.8 | 1.2 |
| 75 COX/DER1 | 296 | 7.2(+11) | - | - | 0.8 | 1.3 |
| NOTE: OPTIMIZATION | | | | | | |
| 75 BAC/HOY | 298-670 | 1.2(+13) | 0 | 1200±150 | 0.7 | 1.3 |
| 76 SIM/HEI | 296 | 6.0(+11) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 77 POW/EVE REACTION ORDER: 2 | 296 | 4.9(+12) | - | - | 0.8 | 1.2 |
| 77 SIM/HEI | 245-328 | 7.2(+12) | 0 | 710±250 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + HO_2 \rightarrow NO_2 + OH + HONO_2$ | | | | | | |
| NITROGEN OXIDE(NO) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 76 SIM/HEI REACTION ORDER: 2 $k/k_{ref}$: 9.5 | 295 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $NO_2 + HO_2 \rightarrow [HO_2 . NO_2]$ | | | | | | |
| --- | | | | | | |
| $NO + HO_2 \rightarrow HONO_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NITROGEN OXIDE(NO) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 75 COX/DER1 REACTION ORDER: 2 | 296 | 8.4(+10) | - | - | 0.8 | 1.3 |
| NOTE: OPTIMIZATION | | | | | | |
| 76 SIM/REI | 296 | <1.2(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $NO + HO_2(+M) \rightarrow HONO_2(+M)$ | | | | | | |
| NITROGEN OXIDE(NO) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 75 COX REACTION ORDER: 2 | 300 | 8.4(+10) | - | - | 0.7 | 1.3 |
| NOTE: M: $N_2 + O_2$ | | | | | | |
| ---------- | | | | | | |
| $NO + H_2O_2 \rightarrow HONO + OH$ | | | | | | |
| NITROGEN OXIDE(NO) + HYDROGEN PEROXIDE | | | | | | |
| 72 GRA/LIS REACTION ORDER: 2 | 298 | <3.1 | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $NO + S^*(^1D) \rightarrow$ products | | | | | | |
| NITROGEN OXIDE(NO) + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.68 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $NO + SH \rightarrow$ products | | | | | | |
| NITROGEN OXIDE(NO) + MERCAPTO FREE RADICAL | | | | | | |
| 73 BRA/TRU REACTION ORDER: 2 | 298 | 6.3(+11) | - | - | | |
| ---------- | | | | | | |
| $NO + N \rightarrow O + N_2$ | | | | | | |
| NITROGEN OXIDE(NO) + NITROGEN ATOM | | | | | | |
| 75 CLY/MCD REACTION ORDER: 2 | 298-670 | 4.9(+13) | 0 | 410±120 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NO + N^*(^2D) \rightarrow$ products | | | | | | |
| NITROGEN OXIDE(NO) + NITROGEN ATOM | | | | | | |
| 72 BUS/KIR2 REACTION ORDER: 2 | 300 | 3.7(+13) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| $NO + N^*(^2P) \rightarrow$ products | | | | | | |
| NITROGEN OXIDE(NO) + NITROGEN ATOM | | | | | | |
| 72 BUS/KIR2 REACTION ORDER: 2 | 300 | 2.0(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $NO + NO \rightarrow N_2O + O$ | | | | | | |
| NITROGEN OXIDE(NO) | | | | | | |
| 73 MYE REACTION ORDER: 2 | 2600-6300 | 2.4(+10) | 0 | 14600 | | |
| ---------- | | | | | | |
| $NO + NO \rightarrow N_2O + O$ | | | | | | |
| NITROGEN OXIDE(NO) | | | | | | |
| 76 MCC/KRU REACTION ORDER: 2 | 1750-2100 | 1.8(+12) | 0 | 32110 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $NO + NO + O_2 \rightarrow NO_2 + NO_2$ | | | | | | |
| NITROGEN OXIDE(NO) + OXYGEN MOLECULE | | | | | | |
| 73 SIE/NIK1 REACTION ORDER: 3 | 298 | 1.5(+10) | - | - | 0.9 | 1.1 |
| 75 ENG/COR | 298-323 | 1.9(+9) | 0 | 602±25 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO + NO_2 + H_2O \rightarrow HONO + HONO$ | | | | | | |
| NITROGEN OXIDE(NO) + NITROGEN OXIDE($NO_2$) + WATER | | | | | | |
| 75 ENG/COR REACTION ORDER: 3 | 298-323 | 1.5(+11) | 0 | 0 | 0.7 | 1.3 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 CHA/NØR | 296 | 2.2(+10) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $NØ + NØ_3 \rightarrow NØ_2 + NØ_2$ | | | | | | |
| NITRØGEN ØXIDE(NØ) + NITRØGEN ØXIDE($NØ_3$) | | | | | | |
| 73 BAR/JØH REACTIØN ØRDER: 2 | 296 | 5.2(+12) | - | - | | |
| NØTE: EVALUATIØN | | | | | | |
| 74 GLA/TRØ1 | 1000-1100 | 8.0(+12) | - | - | 0.5 | 1.5 |
| 75 GRA | 297 | 1.1(+13) | - | - | 0.8 | 1.2 |
| NØTE: $k_1 = Fk_{-1}$ | | | | | | |
| ---------- | | | | | | |
| $NØ + N_2Ø \rightarrow N2 + NØ_2$ | | | | | | |
| NITRØGEN ØXIDE(NØ) + NITRØGEN ØXIDE(N2Ø) | | | | | | |
| 73 BØR/SKA REACTIØN ØRDER: 2 | 1050-2500 | 2.8(+14) | 0 | 25170±1500 | 0.6 | 1.6 |
| NØTE: EVALUATIØN | | | | | | |
| ---------- | | | | | | |
| NØ + NH → products | | | | | | |
| NITRØGEN ØXIDE(NØ) + IMIDØGEN FREE RADICAL | | | | | | |
| 71 GØR/MUL REACTIØN ØRDER: 2 | 298 | 2.3(+13) | - | - | | |
| NØTE: UNREPØRTED T ASSUMED TØ BE 298 | | | | | | |
| 76 HAN/HØE | 298 | 2.8(+13) | - | - | 0.7 | 1.3 |
| NØTE: UNREPØRTED T ASSUMED TØ BE 298K | | | | | | |
| ---------- | | | | | | |
| $NØ + NH_2 \rightarrow H_2Ø + N_2$ | | | | | | |
| NITRØGEN ØXIDE(NØ) + AMIDØGEN FREE RADICAL | | | | | | |
| 72 BED/THØ REACTIØN ØRDER: 2 | 615-660 | - | - | - | | |
| NØTE: $k/k_{ref}$: 0.005exp(322±500/T) | | | | | | |
| $k_{ref}$: $NØ_2 + NH_2 \rightarrow HØNØ + NH$ | | | | | | |
| 75 IES/KBE | 298 | 1.1(+13) | - | - | 0.8 | 1.2 |
| 75 GØR/MUL2 | 300 | 1.2(+13) | - | - | | |
| 75 HAN/LAN | 298 | 1.3(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NØ + NH_2 \rightarrow H_2Ø^* + N_2$ | | | | | | |
| NITRØGEN ØXIDE(NØ) + AMIDØGEN FREE RADICAL | | | | | | |
| 73 GEH/HØY REACTIØN ØRDER: 2 | 298 | 5.0(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NØ + NH_2 \rightarrow$ products | | | | | | |
| NITRØGEN ØXIDE(NØ) + AMIDØGEN FREE RADICAL | | | | | | |
| 71 GØR/MUL REACTIØN ØRDER: 2 | 298 | 1.6(+13) | - | - | | |
| NØTE: UNREPØRTED T ASSUMED TØ BE 298K | | | | | | |
| ---------- | | | | | | |
| $NØ + HØNØ_2 \rightarrow NØ_2 + HØNØ$ | | | | | | |
| NITRØGEN ØXIDE(NØ) + NITRIC ACID | | | | | | |
| 77 KAI/WU REACTIØN ØRDER: 2 | 300 | 9.0(+3) | - | - | | |
| ---------- | | | | | | |
| $NØ + C(^3P) \rightarrow$ products | | | | | | |
| NITRØGEN ØXIDE(NØ) + CARBØN ATØM | | | | | | |
| 75 BUS/YØU REACTIØN ØRDER: 2 | 300 | 2.9(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NØ + {}^1CH_2^* \rightarrow$ products | | | | | | |
| NITRØGEN ØXIDE(NØ) + METHYLENE FREE RADICAL | | | | | | |
| 74 LAU/BAS REACTIØN ØRDER: 2 | 298 | 2.4(+13) | - | - | | |
| NØTE: LIMITING HIGH-PRESSURE k (UPPER LIMIT) | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NO + $^3CH_2$ → $CH_2NO$ | | | | | | |
| NITROGEN OXIDE(NO) + METHYLENE FREE RADICAL ALIGN | | | | | | |
| 77 FIL/ROB REACTION ORDER: 2 ALIGN | 298 | 6.0(+12) | - | - | | |
| NOTE: $^3CH_2$ (GROUND STATE) | | | | | | |
| --- | | | | | | |
| NO + $^3CH_2$ + M → products | | | | | | |
| NITROGEN OXIDE(NO) + METHYLENE FREE RADICAL | | | | | | |
| 74 LAU/BAS M: He | 298 | 9.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: $^3CH_2$ (GROUND STATE). LIMITING HIGH-PRESSURE k | | | | | | |
| --- | | | | | | |
| NO + $CH_3$ → $CH_3NO$ | | | | | | |
| NITROGEN OXIDE(NO) + METHYL FREE RADICAL | | | | | | |
| 72 DAV/COR REACTION ORDER: 2 $k/k_{ref}$: 0.62 | 295 | - | - | - | | |
| NOTE: $k_{ref}$: $NO_2$ + $CH_3$ → $CH_3NO_2$ | | | | | | |
| --- | | | | | | |
| NO + $CH_3$ + M → $CH_3NO$ + M | | | | | | |
| NITROGEN OXIDE(NO) + METHYL FREE RADICAL | | | | | | |
| 71 VAN/CAL REACTION ORDER: 2 | 295 | 1.0(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k; M=$N_2$ OR $CH_3CH_2CH_3$ | | | | | | |
| 74 PEA/VEL REACTION ORDER: 3 M: He | 295 | 1.0(+17) | - | - | 0.9 | 1.1 |
| 74 TIT/BAL REACTION ORDER: 2 | 443 | 1.8(+12) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k; M=$(CH_3)_2CO$ | | | | | | |
| REACTION ORDER: 3 | 443 | 6.1(+16) | - | - | | |
| NOTE: $k_0$ (LOW PRESSURE): M=$(CH_3)_2CO$ | | | | | | |
| 75 LAU/BAS2 REACTION ORDER: 2 | 298 | 1.9(+13) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k; M=He, Ar, $N_2$. | | | | | | |
| 76 FIL/ROB | 298 | 7.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k; M=Ar, OR $SF_6$. | | | | | | |
| 76 PEA/VEL2 M: He | 325-521 | 7.2(+16) | 0 | -210±10 | 0.8 | 1.2 |
| --- | | | | | | |
| NO + .CHO → HNO + CO | | | | | | |
| NITROGEN OXIDE(NO) + METHYL, OXO-, FREE RADICAL | | | | | | |
| 77 SHI/EBA REACTION ORDER: 2 | 298 | 3.4(+12) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| NO + $CH_3O$. → HNO + HCHO | | | | | | |
| NITROGEN OXIDE(NO) + METHOXY FREE RADICAL | | | | | | |
| 73 WIE/HEI REACTION ORDER: 2 $k/k_{ref}$: 0.145 | 298-423 | - | - | - | | |
| NOTE: $k_{ref}$: NO + $CH_3O$. → HNO + HCHO + $CH_3ONO$# | | | | | | |
| 73 WIE/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.145 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: NO + $CH_3O$. → HNO + HCHO + $CH_3ONO$ | | | | | | |
| 75 EAT/MCC | 393-473 | 4.0(+12) | 0 | 0±500 | 0.3 | 3.2 |
| 75 GLA $k/k_{ref}$: 0.13 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: NO + $CH_3O$. → HNO + HCHO + $CH_3ONO$ | | | | | | |
| 77 LAT/MIL3 | 440-472 | 2.0(+12) | 0 | 0±500 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| NO + $CH_3O$. → HNO + HCHO + $CH_3ONO$ | | | | | | |
| NITROGEN OXIDE(NO) + METHOXY FREE RADICAL | | | | | | |
| 73 WIE/VIL REACTION ORDER: 2 $k/k_{ref}$: 1.2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $NO_2$ + $CH_3O$. → HONO + HCHO + $CH_3ONO_2$ | | | | | | |
| --- | | | | | | |
| NO + $CH_3O$. → $CH_3ONO$ | | | | | | |
| NITROGEN OXIDE(NO) + METHOXY FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 BAT/MIL REACTION ORDER: 2 | 393-473 | 1.3(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 75 BAT/MCC | 393-473 | 1.3(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 77 BAT/MIL3 | 440-473 | 1.3(+13) | 0 | 0±500 | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + CH_3O_2\cdot \rightarrow NO_2 + CH_3O\cdot$ | | | | | | |
| NITROGEN OXIDE(NO) + METHYLDIOXY FREE RADICAL | | | | | | |
| 74 SIM/HEI3 REACTION ORDER: 2 $k/k_{ref}$: 2.2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $NO_2 + CH_3O_2\cdot \rightarrow$ products | | | | | | |
| 76 COX/DER2 | 298 | 7.2(+11) | - | - | | |
| NOTE: LOWER LIMIT ESTIMATE | | | | | | |
| --- | | | | | | |
| $NO + CH_3O_2\cdot \rightarrow CH_3O_2NO$ | | | | | | |
| NITROGEN OXIDE(NO) + METHYLDIOXY FREE RADICAL | | | | | | |
| 73 SPI/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.6 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $NO + CH_3O_2\cdot \rightarrow HONO + HCHO + CH_3O_2NO$ | | | | | | |
| --- | | | | | | |
| $NO + CN \rightarrow CO + N_2$ | | | | | | |
| NITROGEN OXIDE(NO) + CYANOGEN FREE RADICAL | | | | | | |
| 75 MUI/PHI REACTION ORDER: 2 | 1500 | 7.3(+12) | - | - | | |
| --- | | | | | | |
| $NO + CH_3CH_2\cdot \rightarrow CH_3CH_2NO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHYL FREE RADICAL | | | | | | |
| 74 PEA/VEL REACTION ORDER: 2 | 295 | 1.2(+11) | - | - | 0.9 | 1.1 |
| 76 PEA/VEL2 REACTION ORDER: 2 | 325-521 | 1.4(+11) | 0 | 0 | 0.6 | 1.6 |
| --- | | | | | | |
| $NO + CH_3C(O)CO\cdot \rightarrow NO_2 + CH_3\cdot + CO_2$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHYLDIOXY, 1-OXO-, FREE RADICAL | | | | | | |
| 76 COX/DER3 REACTION ORDER: 2 $k/k_{ref}$: 1.7 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: $NO_2 + CH_3C(O)O_2\cdot \rightarrow CH_3C(O)O_2NO_2$ | | | | | | |
| --- | | | | | | |
| $NO + CH_3C(O)CO\cdot \rightarrow NO_2 + CH_3C(O)O\cdot$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHYLDIOXY, 1-OXO-, FREE RADICAL | | | | | | |
| 77 BEN/KEN REACTION ORDER: 2 | 298-318 | 2.0(+12) | - | - | | |
| 77 COX/ROF | 300 | 1.6(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + CH_3CH_2O\cdot \rightarrow HNO + CH_3CHO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHOXY FREE RADICAL | | | | | | |
| 77 BAT/MIL2 REACTION ORDER: 2 | 435-491 | 6.3(+12) | 0 | 0±500 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + CH_3CH_2O\cdot \rightarrow CH_3CH_2ONO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHOXY FREE RADICAL | | | | | | |
| 73 BAT/MCC REACTION ORDER: 2 | 393-473 | 2.0(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 74 BAT/MIL | 393-473 | 2.0(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 77 BAT/MIL2 | 435-491 | 2.0(+13) | 0 | 0±500 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + (CH_3)_2CHO\cdot \rightarrow HNO + (CH_3)_2CO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHOXY, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAT/MCC REACTION ORDER: 2 | 393-473 | 4.0(+12) | 0 | 0±500 | 0.3 | 3.2 |
| 77 BAT/MIL1 | 403-433 | 6.3(+12) | 0 | 0±500 | 0.4 | 2.5 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + (CH_3)_2CHO. \rightarrow (CH_3)_2CHONO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHOXY, 1-METHYL-, FREE RADICAL | | | | | | |
| 74 BAT/MIL — REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 75 BAT/MCC | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 77 BAT/MIL1 | 403-433 | 3.2(+13) | 0 | 0±400 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + (CH_3)_3C. \rightarrow HNO + (CH_3)_2C{=}CH_2$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 74 CHO/MEN — REACTION ORDER: 2 | 600 | <3.2(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $NO + (CH_3)_3C. \rightarrow (CH_3)_3CNO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 74 CHO/MEN — REACTION ORDER: 2 | 600 | 3.5(+12) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $NO + CH_3CH_2CH(O.)CH_3 \rightarrow HNO + CH_3CH_2COCH_3$ | | | | | | |
| NITROGEN OXIDE(NO) + PROPOXY, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAT/MCC — REACTION ORDER: 2 | 393-473 | 4.0(+12) | 0 | 0±500 | 0.3 | 3.2 |
| 76 BAT/MCC2 | 403-433 | 6.3(+12) | 0 | 0±500 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + CH_3CH_2CH(O.)CH_3 \rightarrow CH_3CH_2CH(CH_3)ONO$ | | | | | | |
| NITROGEN OXIDE(NO) + PROPOXY, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAT/MCC — REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0 | | |
| 76 BAT/MCC2 | 403-433 | 2.5(+13) | 0 | 0±400 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + (CH_3)_3CO. \rightarrow (CH_3)_3CONO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHOXY,1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 74 BAT/MIL — REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| --- | | | | | | |
| $NO + (CH_3)_3CO. \rightarrow (CH_3)_3CONO$ | | | | | | |
| NITROGEN OXIDE(NO) + ETHOXY,1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 75 BAT/MCC — REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 75 MEN/GOL | 300 | 6.3(+12) | - | - | | |
| NOTE: ESTIMATED k | | | | | | |
| 76 BAT/MIL | 393-433 | 2.5(+13) | 0 | 0±500 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO + M \rightarrow N + O + M$ | | | | | | |
| NITROGEN OXIDE | | | | | | |
| 73 MYE — REACTION ORDER: 2 M: Ar | 2600-6300 | 1.4(+14) | 0 | 74700 | | |
| --- | | | | | | |
| $NO + M \rightarrow$ products | | | | | | |
| NITROGEN OXIDE(NO) | | | | | | |
| 75 TRU/MAC — REACTION ORDER: 2 M: Ne | 2700-4700 | 1.8(+11) | 0.5 | 30458 | | |
| --- | | | | | | |
| $NO_2 + O \rightarrow NO + O_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + OXYGEN ATOM | | | | | | |
| 7[illegible] LY/CRU — REACTION ORDER: 2 | 298 | 3.6(+12) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 72 GER/DEM | 298 | 4.0(+12) | - | - | 0.8 | 1.3 |
| 73 DAV/BER | 230-339 | 5.5(+12) | 0 | 0 | 0.9 | 1.1 |
| 73 SIA/WEØ | 240 | 6.3(+12) | - | - | 0.8 | 1.2 |
| | 296 | 5.6(+12) | - | - | 0.8 | 1.2 |
| 73 HAK/JØH | 296 | 5.5(+12) | - | - | | |
| NØTE: EVALUATIØN | | | | | | |
| 74 EEM/CLY | 298 | 5.7(+12) | - | - | 0.9 | 1.1 |
| | 298-1055 | 1.1(+14) | -0.52 | 0 | 0.7 | 1.4 |
| 74 STE/ALV $k/k_{ref}$: 6.0 | 298 | - | - | - | 0.9 | 1.1 |
| NØTE: $k_{ref}$: $S_2Ø + Ø \rightarrow SØ + SØ$ | | | | | | |
| --- | | | | | | |
| $NØ_2 + Ø^*(^1D) \rightarrow NØ + Ø_2$ | | | | | | |
| NITRØGEN ØXIDE($NØ_2$) + ØXYGEN ATØM | | | | | | |
| 73 BEI/HUS2 REACTIØN ØRDER: 2 | 300 | 1.4(+14) | - | - | 0.9 | 1.1 |
| 73 BEI/HUS2 $k/k_{ref}$: 1.05 | 300 | - | - | - | | |
| NØTE: $k_{ref}$: $N_2Ø + Ø^*(^1D) \rightarrow$ products | | | | | | |
| 75 GAU/SNE $k/k_{ref}$: ~4.0 | 300 | - | - | - | | |
| NØTE: $k_{ref}$: $Ø_2 + Ø^*(^1D) \rightarrow Ø_2^*(^1\Sigma_g^+) + Ø$ | | | | | | |
| 75 GAU/SNE | 300 | 1.8(+14) | - | - | | |
| NØTE: EVALUATIØN (APPRØXIMATE k) | | | | | | |
| --- | | | | | | |
| $NØ_2 + Ø + M \rightarrow NØ_3 + M$ | | | | | | |
| NITRØGEN ØXIDE($NØ_2$) + ØXYGEN ATØM | | | | | | |
| 73 HAK/JØH REACTIØN ØRDER: 3 M: $N_2$ | 296 | 3.0(+16) | - | - | | |
| NØTE: EVALUATIØN | | | | | | |
| 73 GAI/GIA REACTIØN ØRDER: 2 M: $N_2$ | 300 | 6.0(+12) | - | - | | |
| NØTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 73 HUI REACTIØN ØRDER: 3 M: Ar | 263 | 1.4(+17) | - | - | 0.7 | 1.3 |
| M: Ar | 298 | 7.6(+16) | - | - | 0.7 | 1.3 |
| 75 GAI/TRØ REACTIØN ØRDER: 2 M: $N_2$ | 296 | 1.3(+13) | - | - | 0.8 | 1.2 |
| NØTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 75 BIF/SCH M: $N_2$ | 295 | 1.3(+13) | - | - | 0.8 | 1.2 |
| NØTE: LIMITING HIGH-PRESSURE k (REEVALUATIØN) | | | | | | |
| REACTIØN ØRDER: 3 | 295 | 2.9(+16) | - | - | 0.9 | 1.1 |
| NØTE: M eff: $N_2$(1.0); LIMITING LØW-PRESSURE k (REEVALUATIØN) | | | | | | |
| --- | | | | | | |
| $NØ_2 + Ø_3 \rightarrow NØ_3 + Ø_2$ | | | | | | |
| NITRØGEN ØXIDE($NØ_2$) + ØZØNE | | | | | | |
| 73 GBØ/ELL REACTIØN ØRDER: 2 | 298 | 4.7(+7) | - | - | 0.9 | 1.1 |
| 73 STE/NIKI | 298 | 3.9(+7) | - | - | 0.9 | 1.1 |
| 73 WU/MØR | 299 | 1.3(+7) | - | - | 0.9 | 1.2 |
| 74 BEC/SCH | 289 | 2.0(+7) | - | - | | |
| 74 GRA/JØH | 231-298 | 8.1(+10) | 0 | 2466±30 | 0.9 | 1.1 |
| 74 DAV/PRU | 260-343 | 5.4(+10) | 0 | 2428±115 | 0.9 | 1.1 |
| 74 GBØ/ELL | 298 | 1.9(+7) | - | - | 0.8 | 1.2 |
| 75 GRA | 231-298 | 8.1(+10) | 0 | 2466+30 | 0.9 | 1.1 |
| 74 HUI/HER | 259-362 | 9.4(+10) | 0 | 2509±76 | 0.7 | 1.3 |
| 76 GRA | 231-298 | 8.1(+10) | 0 | 2466+30 | 0.9 | 1.1 |
| --- | | | | | | |
| $NØ_2 + H \rightarrow NØ + ØH$ | | | | | | |
| NITRØGEN ØXIDE($NØ_2$) + HYDRØGEN ATØM | | | | | | |
| 76 WAG/WEL REACTIØN ØRDER: 2 | 240-460 | 4.3(+14) | 0 | 505±85 | 0.6 | 1.4 |
| 76 BEM/CLY | 298 | 6.8(+13) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 CLY/MCN | 298-653 | 2.9(+14) | 0 | 174±31 | 0.8 | 1.2 |
| --- | | | | | | |
| $NO_2 + OH + M \rightarrow HONO_2 + M$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + HYDROXYL FREE RADICAL | | | | | | |
| 72 AND/KAU REACTION ORDER: 3 M: Ar | 297 | 3.6(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 297 | 7.3(+17) | - | - | 0.7 | 1.3 |
| 73 SIM/HEI2 REACTION ORDER: 2 M: $H_2O$ | 300-423 | 6.3(+12) | 0 | 170 | | |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION) | | | | | | |
| 72 SIM/HEI2 M: $H_2O$ | 300-423 | 4.0(+18) | 0 | 0 | | |
| NOTE: TEMPERATURE INDEPENDENT $k_0$ (EVALUATION) | | | | | | |
| 72 WES/DEH4 M: He | 273-395 | 7.3(+17) | - | - | | |
| NOTE: k DECREASING WITHIN GIVEN T RANGE FROM $7.3 \times 10^{17}$ TO $2.1 \times 10^{17}$ $cm^6 mol^{-2} s^{-1}$ | | | | | | |
| 72 WES/DEH4 M: Ar | 298 | 3.0(+17) | - | - | | |
| 74 AND/MAK M: He | 295 | 3.6(+17) | - | - | 0.8 | 1.2 |
| M: Ar | 295 | 3.6(+17) | - | - | 0.8 | 1.2 |
| NOTE: A NEGATIVE ACTIVATION ENERGY OF -1800±300 cal/mol (OR E/R=-906±150) WAS DETERMINED IN THE T-RANGE 295-439K | | | | | | |
| M: $N_2$ | 295 | 8.3(+17) | - | - | 0.8 | 1.2 |
| 74 GLA/TRO1 M: He | 295-1200 | 1.4(+25) | -2.98 | 0 | 0.6 | 1.6 |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$) CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[He] | | | | | | |
| REACTION ORDER: 2 | 295-1200 | 4.0(+14) | -0.85 | 0 | 0.6 | 1.6 |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$) M: Ar | | | | | | |
| REACTION ORDER: 3 M: Ar | 295-1200 | 5.6(+24) | -2.9 | 0 | 0.6 | 1.6 |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$). CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[Ar] | | | | | | |
| M: $N_2$ | 622 | 3.0(+17) | - | - | | |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$). CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[$N_2$] | | | | | | |
| M: $N_2$ | 670 | 1.7(+17) | - | - | | |
| NOTE: LIMITING LOW-PRESSURE k (EVALUATION: $k_1 = Kk_{-1}$). CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[$N_2$] | | | | | | |
| 74 HOW/EVE M: $N_2$ | 296 | 1.1(+18) | - | - | | |
| 75 GOL/MULI REACTION ORDER: 2 M: $H_2O$ | 435 | 3.2(+12) | - | - | | |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 HAR/WAY REACTION ORDER: 3 M: Ar | 298 | 5.4(+17) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 298 | 9.4(+17) | - | - | 0.6 | 1.4 |
| 76 ANA/SMI REACTION ORDER: 2 M: $N_2$ | 296 | 9.8(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: $N_2$ | 220-550 | 5.5(+16) | 0 | -818 | 0.8 | 1.2 |
| NOTE: LIMITING LOW PRESSURE k | | | | | | |
| M: $N_2$ | 220-550 | 2.6(+24) | -2.6 | 0 | 0.8 | 1.2 |
| NOTE: LIMITING LOW-PRESSURE k (ALTERNATIVE T-DEPENDENT EXPRESSION) | | | | | | |
| M: $O_2$ | 296 | 6.5(+17) | - | - | | |
| NOTE: M eff: $O_2$(0.68); LIMITING LOW-PRESSURE k | | | | | | |
| M: He | 296 | 3.3(+17) | - | - | | |
| NOTE: M eff: He(0.34); LIMITING LOW-PRESSURE k | | | | | | |
| M: Ar | 296 | 4.0(+17) | - | - | | |
| NOTE: M eff: Ar(0.42); LIMITING LOW-PRESSURE k | | | | | | |
| M: $N_2$ | 296 | 9.6(+17) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: M eff: $N_2$(1.0) LIMITING LOW-PRESSURE k | | | | | | |
| M: $SF_6$ | 296 | 2.4(+18) | - | - | | |
| NOTE: M eff: $SF_6$(2.5); LIMITING LOW-PRESSURE k | | | | | | |
| 76 ATK/PER3 REACTION ORDER: 2 M: Ar | 296 | 3.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: AT 760 TORR | | | | | | |
| M: $N_2$ | 298 | 3.9(+12) | - | - | 0.8 | 1.2 |
| NOTE: AT 760 TORR | | | | | | |
| | 298 | 5.1(+12) | - | - | | |
| NOTE: M=Ar, OR $N_2$(LIMITING HIGH-PRESSURE k) | | | | | | |
| REACTION ORDER: 3 M: Ar | 298 | 3.7(+17) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| 77 ERI/FIE M: $N_2$ | 213-300 | 5.4(+24) | -2.9 | 0 | 0.7 | 1.3 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| M: He | 300 | 3.6(+17) | - | - | 0.6 | 1.4 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| 77 ERI/FIE M: $CO_2$ | 300 | 1.5(+18) | - | - | 0.9 | 1.1 |
| NOTE: $k_0$ (LOW PRESSURE) | | | | | | |
| --- | | | | | | |
| $NO_2 + HO_2 \rightarrow HONO + O_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 74 SIM/HEI2 REACTION ORDER: 2 | 298 | >1.8(+11) | - | - | | |
| NOTE: LOWER LIMIT k | | | | | | |
| 75 COX | 300 | 7.2(+10) | - | - | 0.7 | 1.3 |
| 75 COX/DER1 | 296 | 7.2(+10) | - | - | 0.8 | 1.3 |
| NOTE: OPTIMIZATION | | | | | | |
| 77 HOW | 300 | <1.8(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 77 LEV/USE $k/k_{ref}$: 0.043 | 297 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $NO + HO_2 \rightarrow NO_2 + OH$ EVALUATION | | | | | | |
| 77 LEV/USE $k/k_{ref}$: 0.7 | 297 | - | - | - | 0.4 | 1.6 |
| NOTE: $k_{ref}$: $NO_2 + HO_2(+M) \rightarrow HOONO_2(+M)$ EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2 + HO_2 \rightarrow HOONO_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 76 SIM/HEI REACTION ORDER: 2 | 296 | 5.9(+10) | - | - | 0.6 | 1.4 |
| NOTE: EVALUATION | | | | | | |
| | 245-328 | 2.5(+11) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2 + HO_2 + M \rightarrow HOONO_2 + M$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + HYDROPEROXYL FREE RADICAL | | | | | | |
| 77 HOW REACTION ORDER: 3 M: $O_2$ | 300 | 5.5(+16) | - | - | 0.7 | 1.3 |
| M: He | 300 | 3.6(+16) | - | - | 0.7 | 1.3 |
| M: $N_2$ | 300 | 7.6(+16) | - | - | 0.8 | 1.2 |
| M: $NO_2$ | 300 | 2.4(+17) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $NO_2 + H_2O \rightarrow HONO + OH$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + WATER | | | | | | |
| 76 FIF REACTION ORDER: 2 | 1000-1400 | 8.3(+12) | 0 | 21140 | | |
| NOTE: $k_1 = Kk_{-1}$ | | | | | | |
| --- | | | | | | |
| $NO_2 + H_2O_2 \rightarrow HONO_2 + 1/2H_2O + 1/4O_2$ (overall) | | | | | | |
| NITROGEN OXIDE($NO_2$) + HYDROGEN PEROXIDE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 72 GRA/LIS REACTION ORDER: 2 | 298 | <6.0(+5) | - | - | | |
| NOTE: UPPER LIMIT K | | | | | | |
| --- | | | | | | |
| $NO_2$ + S → NO + SO | | | | | | |
| NITROGEN OXIDE($NO_2$) + SULFUR ATOM | | | | | | |
| 75 CLY/TOW REACTION ORDER: 2 | 298 | 3.7(+13) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $NO_2$ + SO → NO + $SO_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + SULFUR MONOXIDE | | | | | | |
| 71 MIY/TAK2 REACTION ORDER: 2 | 298 | 1.2(+16) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $NO_2$ + $SO_2$ → NO + $SO_3$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + SULFUR DIOXIDE | | | | | | |
| 71 ARM/CUL REACTION ORDER: 2 | 703-1193 | 6.3(+12) | 0 | 13950 | | |
| 77 FRE/PAL | 430-1850 | 6.3(+12) | 0 | 13600 | | |
| NOTE: EXTENDED VALIDITY OF k REPORTED IN 71 ARM/CUL (ABOVE) UP TO 2000 K | | | | | | |
| --- | | | | | | |
| $NO_2$ + N → $N_2O$ + O | | | | | | |
| NITROGEN OXIDE($NO_2$) + NITROGEN ATOM | | | | | | |
| 75 CLY/MCD REACTION ORDER: 2 | 298 | 8.4(+11) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $NO_2$ + NO + $H_2O$ → HONO + HONO | | | | | | |
| NITROGEN OXIDE($NO_2$) + NITROGEN OXIDE(NO) + WATER | | | | | | |
| 75 ENG/COR REACTION ORDER: 3 | 298-323 | 1.5(+11) | 0 | 0 | 0.7 | 1.3 |
| 76 CBA/NOR | 296 | 2.2(+10) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| $NO_2$ + $NO_2$ → NO + $NO_3$ | | | | | | |
| NITROGEN OXIDE($NO_2$) | | | | | | |
| 73 BUT/LEV REACTION ORDER: 2 | 1700-2400 | 3.2(+12) | 0 | 12870 | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2$ + $NO_2$ → NO + anti-$NO_3$ | | | | | | |
| NITROGEN OXIDE($NO_2$) | | | | | | |
| 77 FRE/PAL REACTION ORDER: 2 | 1471-1855 | 3.2(+13) | 0 | 17100 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2$ + $NO_2$ + $H_2O$ → HONO + $HONO_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + WATER | | | | | | |
| 74 ENG/COR REACTION ORDER: 3 | 298-323 | 1.0(+10) | 0 | -492±10 | 0.9 | 1.1 |
| --- | | | | | | |
| $NO_2$ + $NO_2$ + cy-$CH_2CH_2O$ → products | | | | | | |
| NITROGEN OXIDE($NO_2$) + OXIRANE | | | | | | |
| 71 JAF REACTION ORDER: 3 | 298-373 | 1.3(+12) | 0 | 1860 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| --- | | | | | | |
| $NO_2$ + $NO_3$ → NO + $NO_2$ + $O_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + NITROGEN OXIDE($NO_3$) | | | | | | |
| 75 GRA REACTION ORDER: 2 | 298-329 | 1.5(+10) | 0 | 1230±100 | 0.8 | 1.2 |
| NOTE: $k_1 * k_{k-1}$ | | | | | | |
| --- | | | | | | |
| $NO_2$ + $NH_3$ → HONO + $NH_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + AMMONIA | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 72 BED/THO REACTION ORDER: 2 | 615-660 | 4.0(+12) | 0 | 13915±50 | 0.5 | 2.0 |
| --- | | | | | | |
| $NO_2 + CO \rightarrow NO + CO_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + CARBON MONOXIDE | | | | | | |
| 76 MIL REACTION ORDER: 2 | 950-1500 | 3.2(+13) | 0 | 16100±650 | 0.6 | 1.8 |
| 77 FRE/PAL | 1309-1940 | 2.2(+13) | 0 | 14700±800 | 0.6 | 1.7 |
| 77 FRE/PAL | 298-2000 | 8.9(+13) | 0 | 17000 | 0.5 | 2.0 |
| NOTE: BEST FIT (PREFERRED k) | | | | | | |
| --- | | | | | | |
| $NO_2^* + CO \rightarrow NO + CO_2$ | | | | | | |
| NITROGEN MONOXIDE($NO_2$) + CARBON MONOXIDE | | | | | | |
| 76 BER/MAR REACTION ORDER: 2 | 298 | 7.2(+8) | - | - | | |
| NOTE: AT 5060(±10)Å; UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| | 298 | 1.3(+8) | - | - | | |
| NOTE: AT 7500Å; UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| $NO_2 + CH_3 \rightarrow NO + CH_3O.$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + METHYL FREE RADICAL | | | | | | |
| 74 GIA/TRO$_2$ REACTION ORDER: 2 | 1100-1400 | 1.3(+13) | 0 | 0 | | |
| --- | | | | | | |
| $NO_2 + CH_3 \rightarrow CH_3ONO$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + METHYL FREE RADICAL | | | | | | |
| 72 DAV/COR REACTION ORDER: 2 $k/k_{ref}$: 2.17 | 295 | - | - | - | | |
| NOTE: $k_{ref}$: $NO_2 + CH_3 \rightarrow CH_3NO_2$ | | | | | | |
| $k/k_{ref}$: [METHYL NITRITE]/[NITROMETHANE] | | | | | | |
| --- | | | | | | |
| $NO_2 + CH_3 + M \rightarrow CH_3NO_2 + M$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + METHYL FREE RADICAL | | | | | | |
| 74 GIA/TRO$_2$ REACTION ORDER: 2 M: Ar | 300-1400 | 6.3(+14) | -0.6 | 0 | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: Ar | 300-1400 | 2.5(+35) | -6 | 0 | | |
| NOTE: LOW PRESSURE k | | | | | | |
| --- | | | | | | |
| $NO_2 + CH_3O. \rightarrow HONO + HCHO$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + METHOXY FREE RADICAL | | | | | | |
| 77 BAR/BEN REACTION ORDER: 2 $k/k_{ref}$: 0.30 | 396-442 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $NO_2 + CH_3O.(+M) \rightarrow CH_3ONO_2(+M)$ | | | | | | |
| 77 LAT/MIL3 | 440-473 | 5.0(+11) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2 + CH_3O. \rightarrow CH_3ONO_2$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + METHOXY FREE RADICAL | | | | | | |
| 73 WIF/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.92 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $NO_2 + CH_3O. \rightarrow HONO + HCHO + CH_3ONO_2$ | | | | | | |
| 77 BAT/MIL3 | 440-473 | 5.0(+12) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2 + CH_3O.(+M) \rightarrow CH_3ONO_2(+M)$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + METHOXY FREE RADICAL | | | | | | |
| 77 BAR/BEN REACTION ORDER: 2 M: $NO_2$ | 396-442 | 6.3(+12) | 0 | 0 | 0.3 | 3.2 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $NO_2 + CH_3O_2. \rightarrow CH_3O_2NO_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NITROGEN OXIDE($NO_2$) + METHYLDIOXY FREE RADICAL<br>73 SPI/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.75<br>NOTE: $k_{ref}$: $NO_2 + CH_3O_2\cdot \rightarrow HONO_2 + HCHO + CH_3O_2NO_2$ | 298 | - | - | - | 0.9 | 1.1 |
| $NO_2 + CH_3O_2\cdot \rightarrow$ products<br>NITROGEN OXIDE($NO_2$) + METHYLDIOXY FREE RADICAL<br>76 CEX/DER2 REACTION ORDER: 2 $k/k_{ref}$: 0.05<br>NOTE: APPROXIMATE RATIO. $k_{ref}$: $NO + CH_3O_2\cdot \rightarrow NO_2 + CH_3O\cdot$ | 298 | - | - | - | | |
| $NO_2 + CH_2{=}CH_2 \rightarrow$ products<br>NITROGEN OXIDE($NO_2$) + ETHENE<br>71 JAF REACTION ORDER: 2 | 298-373 | 2.0(+6) | 0 | 4100 | | |
| $NO_2 + CH_3C(O)OO\cdot \rightarrow CH_3C(O)OONO_2$<br>NITROGEN OXIDE($NO_2$) + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>77 CEX/ROF REACTION ORDER: 2 $k/k_{ref}$: 0.54<br>NOTE: $k_{ref}$: $NO + CH_3C(O)OO\cdot \rightarrow NO_2 + CH_3C(O)O\cdot$ | 294-328 | - | - | - | 0.7 | 1.3 |
| NOTE: GIVEN WITH CAUTION | 300 | 8.4(+11) | - | - | 0.1 | 10.0 |
| $NO_2 + CH_3CHO \rightarrow HONO + CH_3C(O)\cdot$<br>NITROGEN OXIDE($NO_2$) + ACETALDEHYDE<br>71 JAF REACTION ORDER: 2 | 298-373 | 1.6(+5) | 0 | 3475 | | |
| 72 EAV/COR<br>NOTE: E= 1290 ± 600 cal/mole (E/R= 6490±300K)<br>REPORTED FOR T RANGE 295-395K | 295 | 8.6(0) | - | - | 0.9 | 1.1 |
| $NO_2 + CH_3CH_2O\cdot \rightarrow HONO + CH_3CHO$<br>NITROGEN OXIDE($NO_2$) + ETHOXY FREE RADICAL<br>77 BAT/MIL2 REACTION ORDER: 2<br>NOTE: EVALUATION | 435-491 | 4.0(+12) | 0 | 0 | | |
| $NO_2 + CH_3CH_2O\cdot \rightarrow CH_3CH_2ONO_2$<br>NITROGEN OXIDE($NO_2$) + ETHOXY FREE RADICAL<br>77 BAT/MIL2 REACTION ORDER: 2<br>NOTE: EVALUATION | 435-491 | 7.9(+12) | 0 | 0 | | |
| $NO_2 + CH_3C{\equiv}CH \rightarrow [CH_3C{=}CH.NO_2]$<br>NITROGEN OXIDE($NO_2$) + PROPYNE<br>73 ASH/THO REACTION ORDER: 2 | 443-493 | 2.3(+8) | 0 | 6425±80 | 0.8 | 1.2 |
| $NO_2 + CH_3CH{=}CH_2 \rightarrow [CH_3CH{=}CH_2.NO_2]$<br>NITROGEN OXIDE($NO_2$) + PROPENE<br>76 GRY/KOZ REACTION ORDER: 2 | 293-373 | 2.4(+5) | 0 | 2820 | | |
| $NO_2 + CH_3CH{=}CH_2 \rightarrow$ products<br>NITROGEN OXIDE($NO_2$) + PROPENE<br>71 JAF REACTION ORDER: 2 | 298-373 | 3.2(+6) | 0 | 3950 | | |
| $NO_2 + CH_3CH_2CH_2\cdot \rightarrow NO + CH_3CH_2CH_2O\cdot$<br>NITROGEN OXIDE($NO_2$) + PROPYL FREE RADICAL<br>74 JAF/WAN REACTION ORDER: 2 $k/k_{ref}$: 2.2<br>NOTE: $k_{ref}$: $NO_2 + CH_3CH_2CH_2\cdot \rightarrow CH_3CH_2CH_2NO_2$ | 298 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $NO_2$ + $CH_3CH_2CH_3$ → $HNO_2$ + $(CH_3)_2CH$.<br>NITROGEN OXIDE($NO_2$) + PROPANE<br>76 TIT/BAL REACTION ORDER: 2 | 423-498 | 2.4(+11) | 0 | 11375±60 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO_2$ + $(CH_3)_2CO$ → HONO + $CH_3COCH_2$.<br>NITROGEN OXIDE($NO_2$) + 2-PROPANONE<br>71 JAF REACTION ORDER: 2 | 298-373 | 3.8(+5) | 0 | 3590 | | |
| ---------- | | | | | | |
| $NO_2$ + $CH_3CH_2CH_2O$. → $CH_3CH_2CH_2ONO_2$<br>NITROGEN OXIDE($NO_2$) + PROPOXY FREE RADICAL<br>75 MEN/GOL REACTION ORDER: 2<br>NOTE: ESTIMATED k | 300 | 3.2(+12) | - | - | | |
| ---------- | | | | | | |
| $NO_2$ + $CH_2$=CHC≡CH → products<br>NITROGEN OXIDE($NO_2$) + 1-BUTEN-3-YNE<br>75 GRY/ROZ REACTION ORDER: 2 | 273-333 | 8.8(+5) | 0 | 1710 | | |
| ---------- | | | | | | |
| $NO_2$ + $CH_3C$≡$CCH_3$ → [$CH_3C$=$CCH_3$.$NO_2$]<br>NITROGEN OXIDE($NO_2$) + 2-BUTYNE<br>73 ASF/THO REACTION ORDER: 2 | 443-493 | 8.1(+8) | 0 | 6030±95 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NO_2$ + $CH_3CH_2CH$=$CH_2$ → products<br>NITROGEN OXIDE($NO_2$) + 1-BUTENE<br>71 JAF REACTION ORDER: 2 | 298-373 | 2.5(+6) | 0 | 3680 | | |
| ---------- | | | | | | |
| $NO_2$ + cis-$CH_3CH$=$CHCH_3$ → products<br>NITROGEN OXIDE($NO_2$) + cis-2-BUTENE<br>71 JAF REACTION ORDER: 2 | 298-373 | 2.5(+5) | 0 | 2740 | | |
| ---------- | | | | | | |
| $NO_2$ + trans-$CH_3CH$=$CHCH_3$ → products<br>NITROGEN OXIDE($NO_2$) + trans-2-BUTENE<br>71 JAF REACTION ORDER: 2 | 298-373 | 1.6(+6) | 0 | 3220 | | |
| ---------- | | | | | | |
| $NO_2$ + $(CH_3)_2C$=$CH_2$ → products<br>NITROGEN OXIDE($NO_2$) + 1-PROPENE, 2-METHYL-<br>71 JAF REACTION ORDER: 2 | 298-373 | 4.0(+4) | 0 | 2000 | | |
| ---------- | | | | | | |
| $NO_2$ + $CH_3CH_2CH_2CHO$ → $HNO_2$ + $CH_3CH_2CH_2C(O)$.<br>NITROGEN OXIDE($NO_2$) + BUTANAL<br>74 JAF/WAN REACTION ORDER: 2 | 295-390 | 2.5(+10) | 0 | 6240 | | |
| ---------- | | | | | | |
| $NO_2$ + $(CH_3)_3CO$. → $(CH_3)_3CONO_2$<br>NITROGEN OXIDE($NO_2$) + ETHOXY, 1,1-DIMETHYL-, FREE RADICAL<br>76 EAT/MIL REACTION ORDER: 2<br>NOTE: EVALUATION | 393-433 | 1.6(+13) | 0 | 0 | | |
| ---------- | | | | | | |
| $NO_2$ + $CH_2$=$CH(CH_3)$=$CH_2$ → products<br>NITROGEN OXIDE($NO_2$) + 1,3-BUTADIENE, 2-METHYL-<br>75 GRY/ROZ REACTION ORDER: 2 | 273-433 | 1.7(+7) | 0 | 1060 | | |
| ---------- | | | | | | |
| $NO_2$ + $CH_3CH_2CH_2CH$=$CH_2$ → products<br>NITROGEN OXIDE($NO_2$) + 1-PENTENE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 JAF REACTION ORDER: 2 | 298-373 | 1.6(+6) | 0 | 3650 | | |
| ---------- | | | | | | |
| $NO_2 + CH_3CH_2CH_2CH_2CH{=}CH_2 \rightarrow [CH_3CH_2CH_2CH_2CH{=}CH_2.NO_2]$ | | | | | | |
| NITROGEN OXIDE($NO_2$) + 1-HEXENE | | | | | | |
| 76 GRY/ROZ REACTION ORDER: 2 | 293-333 | 7.7(+7) | 0 | 3520 | | |
| ---------- | | | | | | |
| $NO_3 + O \rightarrow NO_2 + O_2$ | | | | | | |
| NITROGEN OXIDE($NO_3$) + OXYGEN ATOM | | | | | | |
| 75 GRA REACTION ORDER: 2 | 298-329 | 6.0(+12) | 0 | 0 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NO_3 + SO_2 \rightarrow NO_2 + SO_3$ | | | | | | |
| NITROGEN OXIDE($NO_3$) + SULFUR DIOXIDE | | | | | | |
| 75 DAU/CAL REACTION ORDER: 2 | 300 | <4.2(+3) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $NO_3 + NO \rightarrow NO_2 + NO_2$ | | | | | | |
| NITROGEN OXIDE($NO_3$) + NITROGEN OXIDE(NO) | | | | | | |
| 73 HAR/JOH REACTION ORDER: 2 | 296 | 5.2(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 74 GIA/TRO1 | 1000-1100 | 8.0(+12) | - | - | 0.5 | 1.5 |
| 75 GRA REACTION ORDER: 2 | 297 | 1.1(+13) | - | - | 0.8 | 1.2 |
| NOTE: $k_1 = Kk_{-1}$ | | | | | | |
| ---------- | | | | | | |
| $NO_3 + NO_2 \rightarrow NO_2 + NO + O_2$ | | | | | | |
| NITROGEN OXIDE($NO_3$) + NITROGEN OXIDE($NO_2$) | | | | | | |
| 75 GRA REACTION ORDER: 2 | 298-329 | 1.5(+10) | 0 | 1230±100 | 0.8 | 1.2 |
| NOTE: $k_1 = Kk_{-1}$ | | | | | | |
| ---------- | | | | | | |
| $NO_3 + NO_3 \rightarrow NO_2 + NO_2 + O_2$ | | | | | | |
| NITROGEN OXIDE($NO_3$) | | | | | | |
| 75 GRA REACTION ORDER: 2 | 298-329 | 5.1(+11) | 0 | 2450±100 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $NO_3 + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($NO_3$) + ETHENE | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 5.6(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO_3 + CH_3CHO \rightarrow HONO_2 + CH_3C(O).$ | | | | | | |
| NITROGEN OXIDE($NO_3$) + ACETALDEHYDE | | | | | | |
| 74 MCR/NIK REACTION ORDER: 2 | 300 | 7.2(+8) | - | - | 0.7 | 1.3 |
| NOTE: BEST FIT OF EXPERIMENTAL DATA | | | | | | |
| ---------- | | | | | | |
| $NO_3 + CH_3CH{=}CH_2 \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($NO_3$) + PROPENE | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 3.2(+9) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CD_3CD{=}CD_2 \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($NO_3$) + PROPENE-D6 | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 3.6(+9) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NO_3 + CH_3CH_2CH{=}CH_2 \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($NO_3$) + 1-BUTENE | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 4.7(+9) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $NO_3$ + cis-$CH_3CH{=}CHCH_3$ → products<br>NITROGEN OXIDE($NO_3$) + cis-2-BUTENE<br>75 JAP/NIK REACTION ORDER: 2<br>---------- | 300 | 1.1(+11) | - | - | 0.9 | 1.1 |
| $NO_3$ + trans-$CH_3CH{=}CHCH_3$ → products<br>NITROGEN OXIDE($NO_3$) + trans-2-BUTENE<br>75 JAP/NIK REACTION ORDER: 2<br>---------- | 300 | 8.4(+10) | - | - | 0.9 | 1.1 |
| $NO_3$ + $(CH_3)_2C{=}CH_2$ → products<br>NITROGEN OXIDE($NO_3$) + 1-PROPENE, 2-METHYL-<br>75 JAP/NIK REACTION ORDER: 2<br>---------- | 300 | 6.6(+10) | - | - | 0.9 | 1.1 |
| $NO_3$ + $CH_3CH{=}C(CH_3)_2$ → products<br>NITROGEN OXIDE($NO_3$) + 2-BUTENE, 2-METHYL-<br>75 JAP/NIK REACTION ORDER: 2<br>---------- | 300 | 3.3(+12) | - | - | 0.9 | 1.1 |
| $NO_3$ + $(CH_3)_2C{=}C(CH_3)_2$ → products<br>NITROGEN OXIDE($NO_3$) + 2-BUTENE, 2,3-DIMETHYL-<br>75 JAP/NIK REACTION ORDER: 2<br>---------- | 300 | 2.2(+13) | - | - | 0.9 | 1.1 |
| $N_2O$ + O → $N_2$ + $O_2$<br>NITROGEN OXIDE($N_2O$) + OXYGEN ATOM<br>72 SOL REACTION ORDER: 2 | 1000-3000 | 4.5(+13) | 0 | 12130 | | |
| 75 FAB/DEA | 1850-2535 | 1.2(+13) | 0 | 12630 | | |
| 76 DEA | 1950-3075 | 1.2(+13) | 0 | 12630 | | |
| NOTE: EVALUATION<br>76 MIL | 1370-1655 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O$ + O → NO + NO; $k/k_{ref}$: $3.63\times10^4 cm^3 mol^{-1}$<br>---------- | | | | | | |
| $N_2O$ + $O^*(^1D)$ → $N_2$ + $O_2$<br>NITROGEN OXIDE($N_2O$) + OXYGEN ATOM<br>71 GOL/GRE REACTION ORDER: 2 $k/k_{ref}$: 0.33 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → $N_2$ + $O_2$ + NO + NO. (AT 2288 A )<br>$k/k_{ref}$: 0.37 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → $N_2$ + $O_2$ + NO + NO (AT 2537 A )<br>72 GRE $k/k_{ref}$: 0.59 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → NO + NO FOR COMPLETELY<br>THERMALIZED $O^*(^1D)$, $k/k_{ref}$ = 0.85±0.05<br>72 SIM/GRE $k/k_{ref}$: 0.90 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → NO + NO (RATE RATIO VALID<br>FOR $O^*(^1D)$ ATOMS WITH NO EXCESS THERMAL ENERGY<br>$k/k_{ref}$: 0.65 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → NO + NO (RATE RATIO VALID FOR $O^*(^1D)$<br>ATOMS WITH TRANSLATIONAL ENERGY IN EXCESS<br>OF 10 kcal/mol<br>73 GRO/ELL $k/k_{ref}$: 0.7 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → NO + NO<br>74 WIE/PAR $k/k_{ref}$: 1.0 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $N_2O$ + $O^*(^1D)$ → NO + NO<br>---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| $N_2O + O^*(^1D) \rightarrow N_2 + O_2 + NO + NO$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + OXYGEN ATOM | | | | | | |
| 72 LOU/CVE REACTION ORDER: 2 $k/k_{ref}$: 1.25 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: $CO_2 + O^*(^1D) \rightarrow CO_2 + O$ | | | | | | |
| 72 FAR/SYM $k/k_{ref}$: 0.145 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_4C + O^*(^1D) \rightarrow$ products | | | | | | |
| 73 GRO/ELL $k/k_{ref}$: 3.23 | 298 | - | - | - | | |
| NOTE: $O_2 + O^*(^1D) \rightarrow O_2 + O$ | | | | | | |
| 73 BEI/HUS2 | 300 | 1.3(+14) | - | - | 0.9 | 1.1 |
| 75 DEV/NIP | 2160-3400 | 5.2(+13) | 0 | 12557 | 0.5 | 2.0 |
| 75 GAU/SNE $k/k_{ref}$: 3.3 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow O_2^*(^1\Sigma_g^+) + O$ | | | | | | |
| 75 GAU/SNE | 300 | 1.4(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 76 DAV/SAD | 298 | 8.4(+13) | - | - | 0.9 | 1.1 |
| 77 DAV/SCH | 204-359 | 6.6(+13) | 0 | 0 | 0.8 | 1.2 |
| 77 GRO/ELL | 298 | 1.2(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $N_2O + O \rightarrow NO + NO$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + OXYGEN ATOM | | | | | | |
| 71 LIP REACTION ORDER: 2 $k/k_{ref}$: 0.51 | 1400-2000 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O \rightarrow N_2 + O_2$ | | | | | | |
| 72 SOI | 1000-3000 | 4.5(+13) | 0 | 12130 | | |
| 73 LIP/MIL $k/k_{ref}$: 0.5 | 1300-1950 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O \rightarrow N_2 + O_2$ | | | | | | |
| 73 MIL/MAT $k/k_{ref}$: 0.32 | 1169-1655 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O \rightarrow N_2 + O_2$ | | | | | | |
| 75 BAB/DEA | 1850-2535 | 1.2(+13) | 0 | 12630 | | |
| 76 DEA | 1950-3075 | 1.2(+13) | 0 | 12630 | | |
| NOTE: EVALUATION | | | | | | |
| 76 MIL $k/k_{ref}$: 0.252 | 1216-1655 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O \rightarrow N_2 + O_2$ | | | | | | |
| 77 MEN/HAN1 | 1815-3365 | 6.2(+13) | 0 | 12350 | 0.6 | 1.7 |
| --- | | | | | | |
| $N_2O + O^*(^1S) \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($N_2O$) + OXYGEN ATOM | | | | | | |
| 76 SIA/BLA2 REACTION ORDER: 2 | 200-368 | 2.3(+13) | 0 | 423±75 | 0.7 | 1.3 |
| --- | | | | | | |
| $N_2O + H \rightarrow N_2 + OH$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + HYDROGEN ATOM | | | | | | |
| 73 BAL/GET REACTION ORDER: 2 $k/k_{ref}$: 0.64 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + H \rightarrow O + OH$ | | | | | | |
| 73 BAL/GET | 773 | 2.6(+9) | - | - | 0.6 | 1.4 |
| NOTE: EVALUATION | | | | | | |
| 73 BAL/GET | 460-2500 | 1.6(+13) | 0 | 7600±500 | | |
| NOTE: EVALUATION | | | | | | |
| 73 WAL1 $k/k_{ref}$: 0.64 | 773 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O_2 + H \rightarrow O + OH$ | | | | | | |
| | 773 | 2.6(+10) | - | - | 0.6 | 1.4 |
| NOTE: EVALUATION | | | | | | |
| | 700-2500 | 7.6(+13) | 0 | 7600±500 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION (PREFERRED k) | | | | | | |
| 75 AIE/HOY | 718-1111 | 2.2(+14) | 0 | 8710±350 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $N_2O(v=3) + H \rightarrow N_2 + OH$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + HYDROGEN ATOM | | | | | | |
| 77 GER/EGO REACTION ORDER: 2 | 298 | <6.0(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $N_2O + OH \rightarrow N_2 + HO_2$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + HYDROXYL FREE RADICAL | | | | | | |
| 76 BIE/ZET REACTION ORDER: 2 | 298 | 2.3(+7) | - | - | 0.7 | 1.3 |
| 77 CHA/KAU | 480 | <2.4(+8) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $N_2O + OH(v=9) \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($N_2O$) + HYDROXYL FREE RADICAL | | | | | | |
| 76 WER/COL REACTION ORDER: 2 | 298 | 2.9(+10) | - | - | 0.5 | 1.5 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| $N_2O + OH + M \rightarrow N_2 + HO_2 + M$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + HYDROXYL FREE RADICAL | | | | | | |
| 75 GER/MUL1 REACTION ORDER: 2 M: $H_2O$ | 440 | <1.0(+10) | - | - | | |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR; UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $N_2O + OH + M \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($N_2O$) + HYDROXYL FREE RADICAL | | | | | | |
| 76 ATK/PER REACTION ORDER: 2 | 298-443 | <1.2(+8) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k (UPPER LIMIT); (25-654 TORR) | | | | | | |
| ---------- | | | | | | |
| $N_2O + S^*(^1D) \rightarrow NO + NS$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: ~0.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2=CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $N_2O + N^*(^2D) \rightarrow NO + N_2$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + NITROGEN ATOM | | | | | | |
| 71 SIA/WOO REACTION ORDER: 2 | 237-365 | 2.2(+11) | 0.5 | 400 | 0.9 | 1.1 |
| 72 HUS/KIR2 | 300 | 2.9(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $N_2O + N^*(^2P) \rightarrow NO + N_2$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + NITROGEN ATOM | | | | | | |
| 72 HUS/KIR2 REACTION ORDER: 2 | 300 | 2.0(+12) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $N_2O + N^*(^2D) \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($N_2O$) + NITROGEN ATOM | | | | | | |
| 71 LIN/KAU REACTION ORDER: 2 | 300 | 2.1(+12) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $N_2O + NO \rightarrow NO_2 + N_2$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + NITROGEN OXIDE(NO) | | | | | | |
| 73 BCK/SKA REACTION ORDER: 2 | 1050-2500 | 2.8(+14) | 0 | 25170±1500 | 0.6 | 1.6 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $N_2O + C(^3P) \rightarrow$ products | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NITROGEN OXIDE($N_2O$) + CARBON ATOM | | | | | | |
| 75 HUS/YOU REACTION ORDER: 2 | 300 | 7.8(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $N_2O + CO \rightarrow N_2 + CO_2$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + CARBON MONOXIDE | | | | | | |
| 73 MIL/MAT REACTION ORDER: 2 | 1169-1655 | 2.1(+11) | 0 | 8700±1160 | 0.4 | 2.3 |
| 76 MIL REACTION ORDER: 2 | 1169-1655 | 7.1(+11) | 0 | 10570±1050 | 0.5 | 2.2 |
| ---------- | | | | | | |
| $N_2O + CH_3 \rightarrow N_2 + CH_3O$ | | | | | | |
| NITROGEN OXIDE($N_2O$) + METHYL FREE RADICAL | | | | | | |
| 73 FAL/HOA REACTION ORDER: 2 | 873 | 1.4(+7) | - | - | 0.8 | 1.2 |
| 77 BER/ZAM | 1000-2000 | 1.0(+15) | 0 | 14280 | | |
| NOTE: UPPER LIMIT (EVALUATION) | | | | | | |
| ---------- | | | | | | |
| $N_2O + M \rightarrow N_2 + O + M$ | | | | | | |
| NITROGEN OXIDE($N_2O$) | | | | | | |
| 71 DIA REACTION ORDER: 2 M: Ar | 1600-2500 | 2.9(+1) | 0 | 27680 | | |
| NOTE: RATE CONSTANT EXPRESSED AS: | | | | | | |
| $k=[M]2.9X10exp(-27680/T)cm^3mol^{-1}s^{-1}$ | | | | | | |
| 71 LIP M: Kr | 1400-2000 | 1.3(+13) | 0 | 24560±2240 | 0.3 | 4.0 |
| 72 SEL M: $N_2O$ | 1000-3000 | 4.7(+14) | 0 | 29200 | | |
| 72 VER/KIS REACTION ORDER: 1 M: $N_2$ | 1250-1800 | 1.4(+11) | 0 | 26575 | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 73 LIP/MIL REACTION ORDER: 2 M: Kr | 1300-1950 | 1.3(+13) | 0 | 22200 | | |
| 73 VEM M: Ne | 1800-2400 | 3.2(+13) | 0 | 21640±2000 | 0.4 | 2.5 |
| NOTE: LOW PRESSURE | | | | | | |
| 75 BAB/DEA M: Ar | 1850-2535 | 7.8(+14) | 0 | 28630 | | |
| 75 DEV/NIP M: Ar | 2160-2500 | 5.0(+14) | 0 | 29200 | | |
| 76 DEA | 1950-3075 | 2.0(+14) | 0 | 25860 | | |
| NOTE: EVALUATION | | | | | | |
| 77 MEN/HAN1 | 1815-3365 | 1.4(+14) | 0 | 25810 | 0.5 | 1.5 |
| NOTE: M IS Ar, Kr, $N_2$ | | | | | | |
| ---------- | | | | | | |
| $N_2O + M \rightarrow$ products | | | | | | |
| NITROGEN OXIDE($N_2O$) | | | | | | |
| 71 LIP REACTION ORDER: 2 M: Kr | 1400-2000 | 3.1(+12) | 0 | 20500±1550 | 0.3 | 4.0 |
| 74 TRA | | 3.6(+14) | - | 26725 | | |
| NOTE: k MEASURED IN SHOCK TUBE (UNSPECIFIED HIGH T RANGE) | | | | | | |
| 75 BAB/DEA | 1850-2525 | 2.9(+14) | 0 | 26350±620 | 0.8 | 1.3 |
| 76 DEA | 1950-3075 | 1.1(+14) | 0 | 24480±430 | 0.8 | 1.2 |
| | 1950-3075 | 5.2(+13) | 0 | 22070±430 | 0.8 | 1.2 |
| NOTE: 0.01% $H_2$ ADDED | | | | | | |
| ---------- | | | | | | |
| $N_2O_3 + H_2O \rightarrow HONO + HONO$ | | | | | | |
| NITROGEN OXIDE($N_2O_3$) + WATER | | | | | | |
| 75 ENG/COR REACTION ORDER: 2 | 313-323 | 3.1(+14) | 0 | 5133±1760 | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $N_2O_4 + H_2O \rightarrow HONO + HONO_2$ | | | | | | |
| NITROGEN OXIDE($N_2O_4$) + WATER | | | | | | |
| 74 ENG/COR REACTION ORDER: 2 | 298-323 | 6.0(+14) | 0 | 6090±250 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $N_2O_5$ + products | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NITROGEN OXIDE($N_2O_5$) 72 DUT/BUN REACTION ORDER: 1 | 308 | 1.1(-4) | - | - | 0.8 | 1.2 |
| $N_2O_5$ + O → products | | | | | | |
| NITROGEN OXIDE($N_2O_5$) + OXYGEN ATOM 75 GRA REACTION ORDER: 2 | 298 | <1.2(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $N_2O_5$ + $H_2O$ → $HONO_2$ + $HONO_2$ | | | | | | |
| NITROGEN OXIDE($N_2O_5$) + WATER 73 MOR/NIK2 REACTION ORDER: 2 | 298 | <7.8(+3) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $N_2O_5$ + $SO_2$ → $H_2O_4$ + $SO_3$ | | | | | | |
| NITROGEN OXIDE($N_2O_5$) + SULFUR DIOXIDE 75 DAU/CAL REACTION ORDER: 2 | 300 | <2.5(+1) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| NH + NO → products | | | | | | |
| IMIDOGEN FREE RADICAL + NITROGEN OXIDE(NO) 71 GER/MUL REACTION ORDER: 2 | 298 | 2.3(+13) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| 76 HAN/HOE | 298 | 2.8(+13) | - | - | 0.7 | 1.3 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $NH^*(a^1\Delta)$ + $HN_3$ → $NH_2$ + $N_3$ | | | | | | |
| IMIDOGEN FREE RADICAL + HYDRAZOIC ACID 76 FAU/BAI REACTION ORDER: 2 | 298 | 5.6(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $NH^*(a^1\Delta)$ + $HN_3$ → products | | | | | | |
| IMIDOGEN FREE RADICAL + HYDRAZOIC ACID 73 FAU/BAI REACTION ORDER: 2 | 298 | 1.5(+13) | - | - | 0.6 | 1.4 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $NH^*(b^1\Sigma^+)$ + $NH_3$ → products | | | | | | |
| IMIDOGEN FREE RADICAL + AMMONIA 75 ZET/STU REACTION ORDER: 2 | 298 | 2.5(+11) | - | - | 0.8 | 1.3 |
| --- | | | | | | |
| $NH_2$ + O → NH + OH + HNO + H (overall) | | | | | | |
| AMIDOGEN FREE RADICAL + OXYGEN ATOM 73 GEB/HOY REACTION ORDER: 2 | 298 | 2.1(+12) | - | - | | |
| --- | | | | | | |
| $NH_2$ + H + M → $NH_3$ + M | | | | | | |
| AMIDOGEN FREE RADICAL + HYDROGEN ATOM 71 GER/HUL REACTION ORDER: 3 | 298 | 2.2(+18) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $NH_2$ + NO → $N_2$ + $H_2O$ | | | | | | |
| AMIDOGEN FREE RADICAL + NITROGEN OXIDE(NO) 72 BED/THU REACTION ORDER: 2 | 615-660 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.005 exp(3221±500/T) | | | | | | |
| $k_{ref}$: $NH_2$ + $NO_2$ → NH + HONO | | | | | | |
| 75 GER/MUL2 | 300 | 1.2(+13) | - | - | | |
| 75 HAN/LAN | 298 | 1.3(+13) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 LES/KHE | 298 | 1.1(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NH_2$ + NO → $N_2$ + $H_2O^*$ | | | | | | |
| AMIDOGEN FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 73 GEH/HOY REACTION ORDER: 2 | 298 | 5.0(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NH_2$ + NO → products | | | | | | |
| AMIDOGEN FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 71 GER/MUL REACTION ORDER: 2 | 298 | 1.6(+13) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| ---------- | | | | | | |
| $NH_2$ + $NH_2$ → $NH_2NH_2$(OR $N_2$ + $H_2$ + $H_2$) | | | | | | |
| AMIDOGEN FREE RADICAL | | | | | | |
| 71 GER/MUL REACTION ORDER: 2 | 298 | 6.2(+13) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| ---------- | | | | | | |
| $NH_2$ + $NH_2$ → $NH_2NH_2$ | | | | | | |
| AMIDOGEN FREE RADICAL | | | | | | |
| 73 BAC/YOK REACTION ORDER: 2 | 573 | 4.7(+13) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $NH_2$ + $NH_2$ + M → $NH_2NH_2$ + M | | | | | | |
| AMIDOGEN FREE RADICAL | | | | | | |
| 71 GEH/HOY REACTION ORDER: 3 M: He | 213-473 | - | - | - | | |
| NOTE: $k_{ref}$: $NH_2$ + $NH_2$ → NH + $NH_3$; $k/k_{ref}$: $4.7 \times 10^6 cm^3 mol^{-1}$ | | | | | | |
| 77 KHE/SOU REACTION ORDER: 2 M: $N_2$ | 300-500 | 1.5(+13) | 0 | 0±250 | 0.5 | 1.5 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 3 M: Ar | 300-500 | 1.0(+18) | 0 | 0±250 | 0.5 | 1.5 |
| NOTE: LOW PRESSURE k (0 TO 20 TORR); M eff: Ar(0.4) | | | | | | |
| M: $N_2$ | 300-500 | 2.5(+18) | 0 | 0±250 | 0.5 | 1.5 |
| NOTE: LOW PRESSURE k (0 TO 20 TORR); M eff: $N_2$(1.0) | | | | | | |
| 77 KHE/SOU M: $NH_3$ | 300-500 | 1.0(+19) | 0 | 0±250 | 0.5 | 1.5 |
| NOTE: LOW PRESSURE k (0 TO 20 TORR); M eff: $NH_3$(4.0) | | | | | | |
| ---------- | | | | | | |
| $NH_2$ + $NH_2NH_2$ → $NH_3$ + $NH_2NH$. | | | | | | |
| AMIDOGEN FREE RADICAL + HYDRAZINE | | | | | | |
| 71 GEH/HOY REACTION ORDER: 2 | 300 | 3.1(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NH_2$ + $HCONH_2$ → $NH_3$ + .C(O)$NH_2$ | | | | | | |
| AMIDOGEN FREE RADICAL + FORMAMIDE | | | | | | |
| 73 BAC/YOK REACTION ORDER: 2 | 573 | 8.4(+9) | - | - | | |
| ---------- | | | | | | |
| $NH_2$ + $CH_3CH=CH_2$ → products | | | | | | |
| AMIDOGEN FREE RADICAL + PROPENE | | | | | | |
| 76 LES/SOU REACTION ORDER: 2 | 300-500 | 2.9(+11) | 0 | 2165±200 | | |
| ---------- | | | | | | |
| $NH_3$ + O → $NH_2$ + OH | | | | | | |
| AMMONIA + OXYGEN ATOM | | | | | | |
| 74 DOV/NIP REACTION ORDER: 2 | 1620-1920 | <1.0(+13) | 0 | 3320 | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $NH_3$ + $O^*(^1D)$ → $NH_2$ + OH | | | | | | |
| AMMONIA + OXYGEN ATOM | | | | | | |
| 74 DAV/SAD REACTION ORDER: 2 | 298 | 2.0(+14) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 FLF/HUS | 300 | 4.0(+14) | - | - | 0.9 | 1.1 |
| 77 DAV/SCH | 204-354 | 1.5(+14) | 0 | 0 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NH_3 + H \rightarrow NH_2 + H_2$ | | | | | | |
| AMMONIA + HYDROGEN ATOM | | | | | | |
| 74 DOV/NIP REACTION ORDER: 2 | 1500-2500 | 2.8(+13) | 0 | 8760±650 | 0.7 | 1.4 |
| ---------- | | | | | | |
| $NH_3 + OH \rightarrow NH_2 + H_2O$ | | | | | | |
| AMMONIA + HYDROXYL FREE RADICAL | | | | | | |
| 73 GEH/HOY REACTION ORDER: 2 | 298 | 1.7(+11) | - | - | | |
| 73 KUR | 298 | 2.5(+10) | - | - | 0.9 | 1.1 |
| 73 STU3 | 298 | 9.0(+10) | - | - | 0.7 | 1.3 |
| 74 DOV/NIP | 1620-1920 | <8.0(+9) | 0.68 | 554 | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 74 BAC/HOY1 | 298-669 | 3.2(+12) | 0 | 920 | 0.8 | 1.2 |
| 74 ZEL/SMI | 230-490 | 1.4(+12) | 0 | 805 | 0.9 | 1.1 |
| 75 COX/DER2 | 296 | 7.2(+10) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| 75 SMI/ZEL | 228-472 | 1.4(+12) | 0 | 805 | 0.9 | 1.1 |
| 76 FER/ATK1 | 297-427 | 1.8(+12) | 0 | 860±150 | | |
| ---------- | | | | | | |
| $NH_3 + OH + M \rightarrow NH_2 + H_2O + M$ | | | | | | |
| AMMONIA + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 418 | 2.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $NH_3 + NO_2 \rightarrow NH_2 + HONO$ | | | | | | |
| AMMONIA + NITROGEN OXIDE($NO_2$) | | | | | | |
| 72 BED/THO REACTION ORDER: 2 | 615-660 | 4.0(+12) | 0 | 13915±50 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $NH_3 + NH^*(b^1\Sigma^+) \rightarrow$ products | | | | | | |
| AMMONIA + IMIDOGEN FREE RADICAL | | | | | | |
| 75 ZET/STU REACTION ORDER: 2 | 298 | 2.5(+11) | - | - | 0.8 | 1.3 |
| ---------- | | | | | | |
| $NH_3 + CH \rightarrow$ products | | | | | | |
| AMMONIA + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 5.9(+10) | - | - | 0.8 | 1.1 |
| ---------- | | | | | | |
| $NH_3 + M \rightarrow NH_2 + H + M$ | | | | | | |
| AMMONIA | | | | | | |
| 72 HAL REACTION ORDER: 2 M: Ar | 1989-2693 | 1.0(+14) | 0 | 42385 | | |
| 73 GEN/ZHI REACTION ORDER: 1 M: Ar | 2200-2600 | 6.6(+12) | 0 | 49320±2500 | 0.3 | 3.5 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| REACTION ORDER: 2 M: Ar | 2300-3100 | 5.8(+15) | 0 | 38750±2500 | 0.2 | 6.3 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| 73 VEM1 M: Ne | 2300-3200 | 2.5(+14) | 0 | 33200±2000 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $NH_3 + M \rightarrow$ products | | | | | | |
| AMMONIA | | | | | | |
| 72 HAL REACTION ORDER: 2 M: Ar | 1989-2693 | 4.2(+15) | 0 | 41983 | | |
| ---------- | | | | | | |
| cis-NH=NH + trans-NH=NH $\rightarrow N_2 + NH_2NH_2$ | | | | | | |
| cis-DIAZENE + trans-DIAZENE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 6.0 | 373 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: cis-NH=NH + $CH_2$=$CH_2$ → $N_2$ + $CH_3CH_3$. APPROXIMATE RATIO | | | | | | |
| --- | | | | | | |
| cis-NH=NH + $CH_2$=CHCH=$CH_2$ → $N_2$ + $CH_3CH_2CH$=$CH_2$ | | | | | | |
| cis-DIAZENE + 1,3-BUTADIENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.065 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-NH=NH + $CH_2$=$CH_2$ → $N_2$ + $CH_3CH_3$ | | | | | | |
| --- | | | | | | |
| cis-NH=NH + cis-$CH_3CH$=$CHCH_3$ → $N_2$ + $CH_3CH_2CH_2CH_3$ | | | | | | |
| cis-DIAZENE + cis-2-BUTENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.11 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-NH=NH + $CH_2$=$CH_2$ → $N_2$ + $CH_3CH_3$ | | | | | | |
| --- | | | | | | |
| cis-NH=NH + trans-$CH_3CH$=$CHCH_3$ → $N_2$ + $CH_3CH_2CH_2CH_3$ | | | | | | |
| cis-DIAZENE + trans-2-BUTENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.33 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-NH=NH + $CH_2$=$CH_2$ → $N_2$ + $CH_3CH_3$ | | | | | | |
| --- | | | | | | |
| cis-NH=NH + $(CH_3)_2C$=$C(CH_3)_2$ → $N_2$ + $(CH_3)_2CHCH(CH_3)_2$ | | | | | | |
| cis-DIAZENE + 2-BUTENE, 2,3-DIMETHYL- | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.02 | 373 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: cis-NH=NH + $CH_2$=$CH_2$ → $N_2$ + $CH_3CH_3$ APPROXIMATE RATIO | | | | | | |
| --- | | | | | | |
| trans-NH=NH → N2 + $H_2$ + $NH_2NH_2$ (overall) | | | | | | |
| trans-DIAZENE | | | | | | |
| 77 WIL/BAC REACTION ORDER: 1 | 296-433 | 3.0(0) | 0 | 2115 | | |
| --- | | | | | | |
| trans-ND=ND → N2 + $D_2$ + $ND_2ND_2$ (overall) | | | | | | |
| trans-DIAZENE-$d_2$ | | | | | | |
| 77 WIL/BAC REACTION ORDER: 1 | 297-413 | 2.0(0) | 0 | 2215 | | |
| --- | | | | | | |
| trans-NH=NH → cis-NH=NH | | | | | | |
| trans-DIAZENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 1 | 373 | 1.0(-2) | - | - | | |
| 77 WIL/BAC REACTION ORDER: 1 | 296-433 | 1.8(0) | 0 | 2115 | | |
| --- | | | | | | |
| trans-ND=ND → cis-ND=ND | | | | | | |
| trans-DIAZENE-$d_2$ | | | | | | |
| 77 WIL/BAC | 297-413 | 1.0(0) | 0 | 2215 | | |
| --- | | | | | | |
| trans-NH=NH + cis-NH=NH → $NH_2NH_2$ + $N_2$ | | | | | | |
| trans-DIAZENE + cis-DIAZENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 6.0 | 373 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_2$=$CH_2$ + cis-NH=NH → $CH_3CH_3$ + $N_2$ APPROXIMATE RATIO | | | | | | |
| --- | | | | | | |
| $NH_2NH$. + H → $NH_2$ + $NH_2$ | | | | | | |
| HYDRAZYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 71 GEH/HOY REACTION ORDER: 2 | 300 | 1.6(+12) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $NH_2NH_2$ + H → $NH_2NH$. + $H_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| HYDRAZINE + HYDROGEN ATOM | | | | | | |
| 71 FRA/JON REACTION ORDER: 2 | 300-540 | 1.5(+12) | 0 | 650±100 | 0.8 | 1.2 |
| 71 GEB/HOY | 213-473 | 1.3(+13) | 0 | 1260 | | |
| 75 YO | 298 | 1.5(+11) | - | - | | |
| 76 STI/PAY | 228-400 | 5.9(+12) | 0 | 1200±50 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NH_2NH_2$ + OH → products | | | | | | |
| HYDRAZINE + HYDROXYL FREE RADICAL | | | | | | |
| 74 HAC/HOY REACTION ORDER: 2 | 298 | 1.3(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $NH_2NH_2$ + N → $NH_2NH_\bullet$ + NH | | | | | | |
| HYDRAZINE + NITROGEN ATOM | | | | | | |
| 75 YO REACTION ORDER: 2 | 298 | 2.7(+10) | - | - | | |
| ---------- | | | | | | |
| $NH_2NH_2$ + N → products | | | | | | |
| HYDRAZINE + NITROGEN ATOM | | | | | | |
| 75 YO REACTION ORDER: 2 | 298-379 | 3.1(+12) | 0 | 1158 | | |
| ---------- | | | | | | |
| $NH_2NH_2$ + $NH_2$ → $NH_2NH_\bullet$ + $NH_3$ | | | | | | |
| HYDRAZINE + AMIDOGEN FREE RADICAL | | | | | | |
| 71 GEF/HOY REACTION ORDER: 2 | 300 | 3.1(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $NH_2NH_2$ + M → $NH_2$ + $NH_2$ + M | | | | | | |
| HYDRAZINE | | | | | | |
| 74 GEN/ZHI REACTION ORDER: 1 M: Ar | 1100-1400 | 4.0(+13) | 0 | 26675±1000 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $HN_3$ + H → $N_2$ + $NH_2$ | | | | | | |
| HYDRAZOIC ACID + HYDROGEN ATOM | | | | | | |
| 73 LEB/COM REACTION ORDER: 2 | 300-460 | 1.5(+13) | 0 | 2315 | | |
| ---------- | | | | | | |
| $HN_3$ + N → $N_2H$ + $N_2$ | | | | | | |
| HYDRAZOIC ACID + NITROGEN ATOM | | | | | | |
| 73 LEB/COM REACTION ORDER: 2 | 298 | 3.0(+9) | - | - | | |
| ---------- | | | | | | |
| $HN_3$ + $NH^*(a^1\Delta)$ → $N_3$ + $NH_2$ | | | | | | |
| HYDRAZOIC ACID + IMIDOGEN FREE RADICAL | | | | | | |
| 76 PAU/BAI REACTION ORDER: 2 | 298 | 5.6(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $HN_3$ + $NH^*(a^1\Delta)$ → products | | | | | | |
| HYDRAZOIC ACID + IMIDOGEN FREE RADICAL | | | | | | |
| 73 PAU/BAI REACTION ORDER: 2 | 298 | 1.5(+13) | - | - | 0.6 | 1.4 |
| NOTE: UNREFERTED T ASSUMED TO BE 298 K | | | | | | |
| ---------- | | | | | | |
| $HN_3$ + M → $NH^*(^1\Delta)$ + $N_2$ + M | | | | | | |
| HYDRAZOIC ACID | | | | | | |
| 72 ZAS/KOG REACTION ORDER: 1 M: Ar | 1045-1450 | 1.8(+11) | 0 | 20130 | | |
| NOTE: RATE CONSTANT EXPRESSED AS: $k[M]=1.8\times10^{11}\exp(-20130/T)s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| HNO + H → NO + $H_2$ | | | | | | |
| NITROSYL HYDRIDE + HYDROGEN ATOM | | | | | | |
| 72 SMI REACTION ORDER: 2 | 2100 | 2.3(+12) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| HNO + OH → NO + $H_2O$ | | | | | | |
| NITROSYL HYDRIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 SMI REACTION ORDER: 2 | 2100 | 1.1(+13) | - | - | 0.9 | 1.1 |
| 75 CAM/HAN2 $k/k_{ref}$: ≤4.4 | 425 | - | - | - | | |
| NOTE: $k_{ref}$: HNO + O → NO + OH (UPPER LIMIT RATIO) | | | | | | |
| --- | | | | | | |
| HNO + HNO → $H_2O$ + $N_2O$ | | | | | | |
| NITROSYL HYDRIDE | | | | | | |
| 73 WIE/HEI REACTION ORDER: 2 $k/k_{ref}$: 51.0 | 298-423 | - | - | - | | |
| NOTE: $k_{ref}$: HNO + HNO → $H_2O_2$ + $N_2$ | | | | | | |
| --- | | | | | | |
| HONO + OH → $NO_2$ + $H_2O$ | | | | | | |
| NITROUS ACID + HYDROXYL FREE RADICAL | | | | | | |
| 74 COX1 REACTION ORDER: 2 $k/k_{ref}$: 0.37 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: NO + OH + M → HONO + M | | | | | | |
| 74 COX1 | 300 | 1.1(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 74 COX2 | 294 | 1.3(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 75 COX | 300 | 1.3(+12) | - | - | 0.9 | 1.1 |
| 75 COX/DER2 | 298 | 2.2(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 76 COX/DER1 $k/k_{ref}$: 945 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H_2$ + OH → H + $H_2O$ | | | | | | |
| 76 COX/DER1 REACTION ORDER: 2 | 298 | 4.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 76 COX/DER2 $k/k_{ref}$: 904 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_4$ + OH → $CH_3$. + $H_2O$ | | | | | | |
| 76 COX/DER3 $k/k_{ref}$: 0.32 | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3CHO$ + OH → $CH_3C(O)$. + $H_2O$ | | | | | | |
| 76 FIF | 1000-1400 | 1.6(+12) | 0 | 0 | 0.7 | 1.3 |
| NOTE: ALTERNATIVE, T DEPENDENT k: | | | | | | |
| $6.92\times10^{12}\exp(-1760/T)\,cm^3mol^{-1}s^{-1}$ | | | | | | |
| --- | | | | | | |
| HONO + HONO → NO + $HO_2$ + $H_2O$ | | | | | | |
| NITROUS ACID | | | | | | |
| 75 ENG/CGR REACTION ORDER: 2 | 313 | 1.1(+7) | - | - | | |
| NOTE: $k_1 = k_{-1}K$ | | | | | | |
| 76 CBA/NOR | 296 | 5.7(+5) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| HONO + $HONO_2$ → $NO_2$ + $NO_2$ + $H_2O$ | | | | | | |
| NITROUS ACID + NITRIC ACID | | | | | | |
| 77 KAI/WU REACTION ORDER: 2 | 300 | 9.3(+6) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| HONO + M → OH + NO + M | | | | | | |
| NITROUS ACID | | | | | | |
| 76 FIF REACTION ORDER: 1 M: Ar | 1000-1400 | >5.5(+12) | 0 | 24160 | | |
| NOTE: LIMITING HIGH PRESSURE k (LOWER LIMIT ESTIMATE) | | | | | | |
| --- | | | | | | |
| $HONO_2$ + O → $NO_3$ + OH | | | | | | |
| NITRIC ACID + OXYGEN ATOM | | | | | | |
| 72 MOR/SMI REACTION ORDER: 2 | 300 | <7.8(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 CHA/WAY | 300 | <1.8(+7) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $HONO_2$ + H → products | | | | | | |
| NITRIC ACID + HYDROGEN ATOM | | | | | | |
| 74 CHA/WAY REACTION ORDER: 2 | 300 | <1.2(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| --- | | | | | | |
| $HONO_2$ + OH → $NO_3$ + $H_2O$ | | | | | | |
| NITRIC ACID + HYDROXYL FREE RADICAL | | | | | | |
| 72 MCR/SMI REACTION ORDER: 2 | 300 | 7.8(+10) | - | - | 0.6 | 1.4 |
| 74 GIA/TRO1 | 1000-1100 | 9.5(+10) | - | - | 0.8 | 1.2 |
| 74 ZEL/SMI | 240-405 | 5.4(+10) | 0 | 0 | 0.8 | 1.2 |
| 75 MAR/KAU | 270-470 | 5.4(+10) | 0 | 0 | 0.9 | 1.1 |
| 75 SMI/ZEL | 240-406 | 4.8(+10) | 0 | 0 | 0.7 | 1.3 |
| --- | | | | | | |
| $HONO_2$ + NO → HONO + $NO_2$ | | | | | | |
| NITRIC ACID + NITROGEN OXIDE(NO) | | | | | | |
| 77 KAI/WU REACTION ORDER: 2 | 300 | 9.0(+3) | - | - | | |
| --- | | | | | | |
| $HONO_2$ + HONO → $NO_2$ + $NO_2$ + $H_2O$ | | | | | | |
| NITRIC ACID + NITRIC ACID | | | | | | |
| 77 KAI/WU REACTION ORDER: 2 | 300 | 9.3(+6) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $HONO_2$ + M → OH + $NO_2$ + M. | | | | | | |
| NITRIC ACID | | | | | | |
| 73 GER/DEM REACTION ORDER: 2 M: He | 1013-1170 | 1.4(+15) | 0 | 16100±900 | 0.5 | 2.0 |
| 74 GIA/TRO1 REACTION ORDER: 1 M: Ar | 900-1200 | 2.0 | 0 | 24660 | | |
| NOTE: LIMITING HIGH-PRESSURE k ) | | | | | | |
| (APPROXIMATE EXPERIMENTAL VALUE) | 295-1200 | 1.3(+15) | - | 24010 | 0.6 | 1.6 |
| NOTE: LIMITING HIGH-PRESSURE k ) | | | | | | |
| (EVALUATION OVER EXTENDED T-RANGE) | | | | | | |
| REACTION ORDER: 2 M: Ar | 900-1200 | 2.2(+17) | 0 | 20130 | | |
| NOTE: LIMITING LOW-PRESSURE k (APPROXIMATE EXPERIMENTAL VALUE) | | | | | | |
| CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k/[Ar] | | | | | | |
| 74 GIA/TRO1 | 295-1200 | 8.7(+24) | -2.0 | 24010 | 0.6 | 1.6 |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | |
| [EVALUATION OVER EXTENDED T RANGE] | | | | | | |
| CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k[Ar] | | | | | | |
| --- | | | | | | |
| $HOONO_2$ → $HO_2$ + $NO_2$ | | | | | | |
| PEROXYNITRIC ACID | | | | | | |
| 77 GRA/WIN REACTION ORDER: 1 | 254-283 | 1.4(+14) | 0 | 10420±250 | 0.9 | 1.1 |
| 77 SIM/HEI | 245-328 | 6.0(+17) | 0 | 13090 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| $C(^3P) + O_2 \rightarrow CO + O$<br>CARBON ATOM + OXYGEN MOLECULE<br>75 HUS/YOU REACTION ORDER: 2 | 300 | 1.6(+13) | - | - | 0.9 | 1.1 |
| $C^* + H_2 \rightarrow CH + H$<br>CARBON ATOM + HYDROGEN MOLECULE<br>71 HUS/KIR1 REACTION ORDER: 2<br>NOTE: $C^*(2\,^1D_2)$ STATE. | 300 | 1.6(+14) | - | - | 0.9 | 1.1 |
| $C(^3P) + H_2 + M \rightarrow$ products<br>CARBON ATOM + HYDROGEN MOLECULE<br>75 HUS/YOU REACTION ORDER: 3 M: He | 300 | 2.5(+16) | - | - | 0.8 | 1.2 |
| $C(^3P) + H_2O \rightarrow$ products<br>CARBON ATOM + WATER<br>75 HUS/YOU REACTION ORDER: 2<br>NOTE: UPPER LIMIT k | 300 | <6.0(+11) | - | | | |
| $C + N + M \rightarrow CN^*(B) + M$<br>CARBON ATOM + NITROGEN ATOM<br>75 WAS/KLE REACTION ORDER: 3 M: Ar<br>NOTE: UNREPORTED T ASSUMED TO BE 298K | 298 | 3.4(+15) | - | - | 0.7 | 1.3 |
| $C(^3P) + NO \rightarrow$ products<br>CARBON ATOM + NITROGEN OXIDE(NO)<br>75 AUS/YOU REACTION ORDER: 2 | 300 | 2.9(+13) | - | - | 0.8 | 1.2 |
| $C(^3P) + N_2O \rightarrow$ products<br>CARBON ATOM + NITROGEN OXIDE($N_2O$)<br>75 HUS/YOU REACTION ORDER: 2 | 300 | 7.8(+12) | - | - | 0.8 | 1.2 |
| $C + C + M \rightarrow C_2 + M$<br>CARBON ATOM<br>76 SLA REACTION ORDER: 3 M: Ar<br>NOTE: EVALUATION BASED ON REVERSE REACTION MEASUREMNTS | 5000-6000 | 1.8(21) | -1.6 | 0 | 0.4 | 1.6 |
| $C(^3P) + CO_2 \rightarrow$ products<br>CARBON ATOM + CARBON DIOXIDE<br>75 HUS/YOU REACTION ORDER: 2<br>NOTE: UPPER LIMIT k | 300 | <6.0(+8) | - | - | | |
| $C + CN \rightarrow C_2 + N$<br>CARBON ATOM + CYANOGEN FREE RADICAL<br>76 SLA REACTION ORDER: 2<br>NOTE: EVALUATION | 5000-8000 | 3.0(+14) | 0 | 18120 | 0.5 | 1.5 |
| $C^*(^1S_0) + OC=C=CO \rightarrow$ products<br>CARBON ATOM + 1,2-PROPADIENE-1,3-DIONE<br>74 HUS/KIR REACTION ORDER: 2 | 300 | 6.0(+13) | - | - | | |
| $C(^3P) + OC=C=CO \rightarrow$ products<br>CARBON ATOM + 1,2-PROPADIENE-1,3-DIONE<br>75 HUS/YOU REACTION ORDER: 2 | 300 | 1.1(+14) | - | - | 0.9 | 1.1 |
| $C^* + M \rightarrow$ products<br>CARBON ATOM<br>71 HUS/KIR2 REACTION ORDER: 2 M: $O_2$ | 300 | 1.6(+13) | - | - | | |
| NOTE: $C^*(2\,^1D_2)$ STATE. APPROXIMATE k<br>M: $H_2O$ | 300 | 1.0(+13) | - | - | | |
| NOTE: $C^*(2\,^1D_2)$ STATE APPROXIMATE k.<br>M: NO | 300 | 2.8(+13) | - | - | 0.7 | 1.3 |
| NOTE: $C^*(2\,^1D_2)$ STATE<br>M: $N_2O$ | 300 | 8.4(+13) | - | - | 0.6 | 1.4 |
| NOTE: $C^*(2\,^1D_2)$ STATE | | | | | | |

| CHEMICAL REACTIONS | | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|---|
| | M: CO | 300 | 9.6(+13) | - | - | 0.6 | 1.4 |
| NOTE: $C^*(2^1D_2)$ STATE | | | | | | | |
| | M: $CO_2$ | 300 | 2.2(+13) | - | - | 0.5 | 1.5 |
| NOTE: $C^*(2^1D_2)$ STATE | | | | | | | |
| | M: $CH_4$ | 300 | 1.3(+14) | - | - | 0.8 | 1.2 |
| NOTE: $C^*(2^1D_2)$ STATE | | | | | | | |
| | | 300 | 2.2(+14) | - | - | | |
| NOTE: $C^*(2^1D_2)$ STATE. APPROXIMATE k [M: $CH_2=CH_2$.] | | | | | | | |
| --- | | | | | | | |
| $CO + O^*(^1D) \rightarrow CO_2$ | | | | | | | |
| CARBON MONOXODE + OXYGEN ATOM | | | | | | | |
| 73 HEI/HUSI REACTION ORDER: 2 | | 300 | 4.4(+13) | - | - | 0.9 | 1.1 |
| $k/k_{ref}$: 1.05 | | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow$ products | | | | | | | |
| --- | | | | | | | |
| $CO + O + M \rightarrow CO_2 + M$ | | | | | | | |
| CARBON MONOXIDE + OXYGEN ATOM | | | | | | | |
| 71 STU/NIKI REACTION ORDER: 3 | M: He | 300 | 6.2(+11) | - | - | 0.7 | 1.3 |
| | M: $N_2$ | 300 | 8.0(+11) | - | - | 0.7 | 1.3 |
| | M: CO | 300 | 1.2(+12) | - | - | 0.7 | 1.3 |
| 71 MIY/TAKI | M: Ar | 298 | 2.1(+16) | - | - | 0.7 | 1.3 |
| 72 BAL/JAC | M: Ar | 300-3500 | 3.0(+14) | 0 | 1510 | | |
| NOTE: EVALUATION | | | | | | | |
| $CO + O + M \rightarrow CO_2 + M$ | | | | | | | |
| 72 DEM REACTION ORDER: 2 | M: $CO_2$ | 298 | 9.8(+7) | - | - | | |
| NOTE: k INCREASING FROM $9.8\times10^7$ TO $3.5\times10^8 cm^3mol^{-1}s^{-1}$ BETWEEN 0.74 AND 42 ATM PRESSURE. HIPPLER AND TROE'S EXPRESSION USED. | | | | | | | |
| | M: $CO_2$ | 298 | 5.2(+7) | - | - | | |
| NOTE: k INCREASING FROM $5.2\times10^7$ TO $2.8\times10^8 cm^3mol^{-1}s^{-1}$ BETWEEN 0.74 AND 42 ATM PRESSURE. HIPPLER AND TROE'S EXPRESSION USED. | | | | | | | |
| 72 SIM/HEI | M: $N_2O$ | 298-472 | 1.6(+10) | 0 | 1460 | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| 72 SIM/HEI REACTION ORDER: 3 | M: $N_2O$ | 298-472 | 5.9(+15) | 0 | 2065 | | |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | | |
| 72 SLA/WOO | M: $N_2$ | 296 | 8.3(+11) | - | - | 0.8 | 1.2 |
| | M: CO | 250-370 | 2.4(+15) | 0 | 2185±275 | 0.8 | 1.2 |
| | M: $CO_2$ | 296 | 2.2(+12) | - | - | 0.9 | 1.1 |
| 72 ZAB/HAR | | 1400-1500 | <2.0(+14) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | | |
| 73 INN | M: Ar | 296 | 3.6(+12) | - | - | 0.8 | 1.2 |
| | M: CO | 296 | 1.6(+12) | - | - | 0.8 | 1.2 |
| 73 GAE/GLA REACTION ORDER: 2 | M: CO | 300 | <3.0(+8) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE, UPPER LIMIT k | | | | | | | |
| 73 INN REACTION ORDER: 3 | M: $CO_2$ | 296 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 74 HAR/VAS | M: Ar | 1500 | <2.0(+14) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | | |
| 74 INN | M: $CO_2$ | 257-277 | 8.0(+14) | 0 | 1780±410 | | |
| 74 KEN | M: $O_2$ | 400-500 | 2.4(+12) | 0 | -1860 | | |
| NOTE: REEVALUATION | | | | | | | |
| 74 WAG/ZAB | M: Ar | 298-4000 | 1.0(+19) | -1.5 | 2520 | | |
| NOTE: LIMITING LOW-PRESSURE k | | | | | | | |
| 76 WEI | M: Ar | 2500-2900 | 3.0(+18) | -1.0 | 2000 | | |
| --- | | | | | | | |
| $CO + O_2 \rightarrow CO_2 + O$ | | | | | | | |
| CARBON MONOXIDE + OXYGEN MOLECULE | | | | | | | |
| 71 BRA/BEL1 REACTION ORDER: 2 | | 1300-1900 | 1.6(+13) | 0 | 20640 | 0.6 | 1.7 |
| NOTE: EVALUATION | | | | | | | |
| 76 WEI | | 2500-2900 | 2.5(+13) | 0 | 24160 | | |
| --- | | | | | | | |
| $CO + O_3 \rightarrow CO_2 + O_2$ | | | | | | | |
| CARBON MONOXIDE + OZONE | | | | | | | |
| 72 ARI/WAR REACTION ORDER: 3 | | 296 | <2.4(-1) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CO + O_3 \rightarrow$ products | | | | | | |
| CARBON MONOXIDE + OZONE | | | | | | |
| 73 STE/NIK2 REACTION ORDER: 2 | 298 | 6.0(+2) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CO + H + M \rightarrow CHO + M$ | | | | | | |
| CARBON MONOXIDE + HYDROGEN ATOM | | | | | | |
| 71 BEN/BIA M: $H_2$ | 298 | <1.2(+14) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| 71 HIK/EYR REACTION ORDER: 3 M: $H_2$ | 298 | 4.0(+13) | - | - | 0.8 | 1.2 |
| M: Ar | 298 | 2.6(+13) | - | - | 0.8 | 1.2 |
| 72 ABU/MIC M: He | 298 | 2.2(+13) | - | - | 0.9 | 1.1 |
| NOTE: $M_{eff}$: He(1.0) | | | | | | |
| M: Ne | 298 | 1.7(+13) | - | - | 0.9 | 1.1 |
| NOTE: $M_{eff}$: Ne(0.8) | | | | | | |
| M: Ar | 298 | 2.2(+13) | - | - | 0.9 | 1.1 |
| NOTE: $M_{eff}$: Ar(1.0) | | | | | | |
| M: Kr | 298 | 2.5(+13) | - | - | 0.9 | 1C1 |
| NOTE: $M_{eff}$: Kr(1.1) | | | | | | |
| M: $H_2$ | 298 | 2.9(+13) | - | - | 0.9 | 1.1 |
| NOTE: $M_{eff}$: $H_2$(1.3) | | | | | | |
| 72 BAL/JAC M: $H_2$ | 773 | 2.3(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 73 AZA/AND M: Ar | 298 | 4.0(+13) | - | - | 0.5 | 1.5 |
| M: CO | 298 | 8.0(+13) | - | - | 0.7 | 1.3 |
| 77 WAN M: $H_2$ | 298-373 | - | - | 100 | | |
| ---------- | | | | | | |
| $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| CARBON MONOXIDE + HYDROXYL FREE RADICAL | | | | | | |
| 71 BRA/BEL1 REACTION ORDER: 2 | 1300-1900 | 4.2(+11) | 0 | 500±100 | 0.7 | 1.3 |
| 72 DIX | 1050 | 2.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 72 STU/NIK1 | 298 | 8.1(+10) | - | - | 0.9 | 1.2 |
| 73 DAY/THO | 1050 | 2.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| 73 GAR/MAL | 1200-2500 | 4.0(+12) | 0 | 4025 | 0.8 | 1.2 |
| 73 PEE/MAH1 | 1750 | 2.8(+11) | - | - | | |
| 73 SMI/ZEL1 | 300 | 8.7(+10) | - | - | | |
| 73 SMI/ZEL2 | 300 | 8.7(+10) | - | - | | |
| NOTE: WITHIN THE 210-460 K RANGE, SLIGHT POSITIVE T DEPENDENCE, POSSIBLY CURVED | | | | | | |
| 73 WES/DEH1 | 298-915 | 8.0(+10) | - | - | | |
| NOTE: NONLINEAR ARRHENIUS BEHAVIOUR; WITHIN THE GIVEN T RANGE, k INCREASES FROM $8.0 \times 10^{10}$ TO $13.1 \times 10^{10}$ $cm^3 mol^{-1} s^{-1}$ | | | | | | |
| 74 DAV/FIS | 220-373 | 1.3(+11) | 0 | 80±40 | 0.9 | 1.1 |
| 74 HOW/EVE | 296 | 9.4(+10) | - | - | | |
| 74 TRA/ROS2 | 300 | 7.5(+10) | - | - | | |
| 75 BIC/LAZ | 1350-1750 | 4.7(+11) | 0 | 0 | | |
| 75 STE/ZEL | 300 | 9.3(+10) | - | - | 0.8 | 1.2 |
| NOTE: NONLINEAR ARRHENIUS BEHAVIOUR; WITHIN THE T RANGE 300-900K: log k=10.85(±0.08) + $4.0 \times 10^{-4}$T($cm^3 mol^{-1} s^{-1}$) | | | | | | |
| 75 TRA/ROS | 300 | 7.5(+10) | - | - | | |
| 75 VAN/PLE | 400-800 | 8.0(+10) | - | - | | |
| NOTE: NONLINEAR ARRHENIUS BEHAVIOR; WITHIN THE GIVEN T RANGE, k INCREASES ONLY SLIGHTLY FROM $8.0 \times 10^{10}$ $cm^3 mol^{-1} s^{-1}$ | | | | | | |
| REACTION ORDER: 2 | 1000-1800 | 2.3(+12) | 0 | 2870 | | |
| 76 BRA/CAP $k/k_{ref}$: 0.18 | 1300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_4 + OH \rightarrow CH_3 \cdot + H_2O$ | | | | | | |
| 76 SIE/SIM1 | 217-276 | - | - | - | | |
| NOTE: $k_{ref}$: $H_2 + OH \rightarrow H + H_2O$ $k/k_{ref}$:0.20 exp(+1710/T) | | | | | | |
| HIGH-PRESSURE LIMITING VALUE | | | | | | |
| 76 SIE/SIM1 $k/k_{ref}$: 14.0 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H_2 + OH \rightarrow H + H_2O$; $k/k_{ref}$ RATIO INCREASING FROM A LOW-PRESSURE LIMITING VALUE OF 14 TO A HIGH-PRESSURE LIMITING VALUE OF 50 | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 CCX/DER1 $k/k_{ref}$: 38.6 | 298 | - | - | - | | |
| NOTE: KREF: $H_2 + OH \rightarrow H + H_2O$ | 298 | 1.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION<br>77 CHA/USE $k/k_{ref}$: 0.059 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_3CH + OH \rightarrow (CH_3)_3C. + (CH_3)_2CHCH_2. + H_2O$<br>(AT 100 TORR) | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_3CH + OH \rightarrow (CH_3)_3C. + (CH_3)_2CHCH_2.$<br>(AT 700 TORR) | | | | | | |
| ---------- | | | | | | |
| $CO + OH(V=1) \rightarrow CO_2 + H$ | | | | | | |
| CARBON MONOXIDE + HYDROXYL FREE RADICAL<br>77 SPE/GLA REACTION ORDER: 2 | 295 | <3.0(+12) | - | - | | |
| NOTE: UPPER LIMIT k<br>77 SPE/END | 295 | 1.8(+11) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CO + OH + M \rightarrow CO_2 + H + M$ | | | | | | |
| CARBON MONOXIDE + HYDROXYL FREE RADICAL<br>75 GOR/MUL1 REACTION ORDER: 2 | 298 | 9.1(+10) | - | - | 0.9 | 1.1 |
| NOTE: M=Ar(710TORR) + $H_2O$ (10TORR) + CO (10TORR)<br>76 ATK/PER M: Ar | 299 | 9.3(+10) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k (25-634TORR) | | | | | | |
| ---------- | | | | | | |
| 76 SIE/SIM2 REACTION ORDER: 2 M: $H_2$ | 298 | 2.1(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k (EVALUATION)<br>77 EVE/PAR1 M: He | 296 | 1.2(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k (50TORR)<br>M: $SF_6$ | 296 | 2.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE k (200 AND 350TORR) | | | | | | |
| ---------- | | | | | | |
| CO + OH + M → products | | | | | | |
| CARBON MONOXIDE + HYDROXYL FREE RADICAL<br>77 PER/ATK2 REACTION ORDER: 2 M: Ar | 299 | 9.4(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN PRESSURE RANGE 25 TO 643TORR<br>M: $SF_6$ | 299 | 9.4(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT k INCREASING<br>FROM $9.4 \times 10^{10}$ TO $2.1 \times 10^{11}$ $cm^3 mol^{-1} s^{-1}$<br>WITHIN THE 25-604 TORR. PRESSURE RANGE | | | | | | |
| ---------- | | | | | | |
| $CO + HO_2 \rightarrow CO_2 + OH$ | | | | | | |
| CARBON MONOXIDE + HYDROPEROXYL FREE RADICAL<br>72 VAR/DAN REACTION ORDER: 2 | 878-952 | 1.3(+14) | 0 | 11600±1500 | | |
| 72 WES/DEH1 $k/k_{ref}$: 0.06 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H + HO_2 \rightarrow OH + OH$ (EVALUATION)<br>73 GOK | 298 | <9.6(+7) | - | - | | |
| NOTE: UPPER LIMIT k<br>73 DAV/PAY | 300 | <6.0(+3) | - | - | | |
| NOTE: EVALUATION; UPPER LIMIT k<br>73 SIM/HEI1 | 373-473 | <3.0(+6) | - | - | | |
| NOTE: EVALUATION; UPPER LIMIT k<br>75 VAR/SAC | 878-952 | 1.0(+14) | 0 | 11600±1500 | 0.7 | 1.3 |
| 77 CEL/NAE | 1110 | 5.6(+9) | - | - | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| CO + S*(1D) → products | | | | | | |
| CARBON MONOXIDE + SULFUR ATOM<br>72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.19 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2=CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CO + {}^1SO_2^* \rightarrow CO_2 + SO$ | | | | | | |
| CARBON MONOXIDE + SULFUR DIOXIDE<br>73 CEH/HEI REACTION ORDER: 2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $SO_2 + {}^1SO_2^* \rightarrow$ products; $k/k_{ref}=5.0 \times 10^{-3}$(AT 2537A) | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $SO_2 + {}^1SO_2^* \rightarrow$ products; $k/k_{ref}=1.5 \times 10^{-3}$(AT 3130A) | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CO + SO_2^{*} \rightarrow CO_2 + SO$ | | | | | | |
| CARBON MONOXIDE + SULFUR DIOXIDE | | | | | | |
| 73 CEH/HEI REACTION ORDER: 2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $SO_2^{*} \rightarrow$ products; $k/k_{ref}$=2.2X10$^{-5}$(3130 TO 3261A) | | | | | | |
| $SO_2^{*}$ IS A VIBRATIONALLY EXCITED SINGLET | | | | | | |
| --- | | | | | | |
| $CO + SO_2^{**} \rightarrow CO_2 + SO$ | | | | | | |
| CARBON MONOXIDE + SULFUR DIOXIDE | | | | | | |
| 73 CEH/HEI REACTION ORDER: 2 | 300 | - | - | - | 0.7 | 1.4 |
| NOTE: $k_{ref}$: $SO_2^{**} \rightarrow SO_2$; $k/k_{ref}$=1.8X10$^{-5}$(2537 TO 3261A) | | | | | | |
| $SO_2^{*}$ IS A CHEMICALLY ACTIVE TRIPLET | | | | | | |
| --- | | | | | | |
| $CO + SO_2 + M \rightarrow$ products | | | | | | |
| CARBON MONOXIDE + SULFUR DIOXIDE | | | | | | |
| 71 BAU/JEF REACTION ORDER: 2 M: Ar | 1770-2453 | 2.7(+12) | 0 | 24300±600 | 0.8 | 1.3 |
| NOTE: AT 27-170 TORR PRESSURE | | | | | | |
| --- | | | | | | |
| $CO + NO_2 \rightarrow CO_2 + NO$ | | | | | | |
| CARBON MONOXIDE + NITROGEN OXIDE($NO_2$) | | | | | | |
| 76 NIL REACTION ORDER: 2 | 950-1500 | 3.2(+13) | 0 | 16100±650 | 0.6 | 1.8 |
| 77 FRE/PAL REACTION ORDER: 2 | 1309-1946 | 2.2(+13) | 0 | 14700±800 | 0.6 | 1.7 |
| 77 FRE/PAL REACTION ORDER: 2 | 298-2000 | 8.9(+13) | 0 | 17000 | 0.5 | 2.0 |
| NOTE: BEST FIT (PREFERRED k) | | | | | | |
| --- | | | | | | |
| $CO + NO_2^{*} \rightarrow CO_2 + NO$ | | | | | | |
| CARBON MONOXIDE + NITROGEN MONOXIDE ($NO_2$) | | | | | | |
| 76 HER/MAR REACTION ORDER: 2 | 298 | 7.2(+8) | - | - | | |
| NOTE: AT 5060±10A. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| 76 HER/MAR REACTION ORDER: 2 | 298 | 1.3(+8) | - | - | | |
| NOTE: AT 7500A. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| --- | | | | | | |
| $CO + N_2O \rightarrow CO_2 + N_2$ | | | | | | |
| CARBON MONOXIDE + NITROGEN OXIDE($N_2O$) | | | | | | |
| 73 MIL/MAT REACTION ORDER: 2 | 1169-1655 | 2.1(+11) | 0 | 8700±1160 | 0.4 | 2.3 |
| --- | | | | | | |
| 76 MIL REACTION ORDER: 2 | 1169-1655 | 7.1(+11) | 0 | 10570±1050 | 0.5 | 2.2 |
| --- | | | | | | |
| $CO + CH \rightarrow$ products | | | | | | |
| CARBON MONOXIDE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 2.9(+12) | - | - | | |
| --- | | | | | | |
| $CO + {}^1CH_2^{*}: \rightarrow$ products | | | | | | |
| CARBON MONOXIDE + METHYLENE FREE RADICAL | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 5.4(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k. (UPPER LIMIT) | | | | | | |
| --- | | | | | | |
| $CO + {}^3CH_2: \rightarrow$ products | | | | | | |
| CARBON MONOXIDE + METHYLENE FREE RADICAL | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 6.0(+8) | - | - | | |
| NOTE: $^3CH_2$: (GROUND STATE). LIMITING HIGH PRESSURE k. | | | | | | |
| --- | | | | | | |
| $CO + CH_3\cdot \rightarrow CH_3O\cdot$ | | | | | | |
| CARBON MONOXIDE + METHYL FREE RADICAL | | | | | | |
| 74 WAT/WIL REACTION ORDER: 2 | 260-296 | 1.6(+11) | 0 | 3000±15 | 0.6 | 1.6 |
| --- | | | | | | |
| $CO + CH_3O\cdot \rightarrow CO_2 + CH_3\cdot$ | | | | | | |
| CARBON MONOXIDE + METHOXY FREE RADICAL | | | | | | |
| 73 LIS/MAS REACTION ORDER: 2 | 396-426 | 1.6(+13) | 0 | 5940±750 | 0.3 | 4.0 |
| --- | | | | | | |
| $CO + CH_3O\cdot \rightarrow$ products | | | | | | |
| CARBON MONOXIDE + METHOXY FREE RADICAL | | | | | | |
| 73 WIE/HEI REACTION ORDER: 2 | 298-423 | - | - | - | | |
| NOTE: $k_{ref}$: $NO + CH_3O\cdot \rightarrow HNO + HCHO + CH_3ONO^{*}$ $k/k_{ref}$: ≈5X10$^{-4}$ | | | | | | |
| --- | | | | | | |
| $CO + CH_3CH_2\cdot \rightarrow CH_3CH_2C(O)\cdot$ | | | | | | |
| CARBON MONOXIDE + ETHYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 WAT/THO REACTION ORDER: 2 | 238-278 | 1.5(+11) | 0 | 2420 | | |
| $CO_2 + O \rightarrow CO + O_2$ | | | | | | |
| CARBON DIOXIDE + OXYGEN ATOM | | | | | | |
| 74 BAB/DEA REACTION ORDER: 2 | 3015-4675 | 4.8(+12) | 0 | 18170±1460 | 0.6 | 1.6 |
| $CO_2 + O^*(^1D) \rightarrow CO + O_2^*$ | | | | | | |
| CARBON DIOXIDE + OXYGEN ATOM | | | | | | |
| 73 HEI/HUSI REACTION ORDER: 2 | 300 | 1.3(+4) | - | - | 0.9 | 1.1 |
| $CO_2 + O^*(^1D) \rightarrow CO + O_2^*$ | | | | | | |
| CARBON DIOXIDE + OXYGEN ATOM | | | | | | |
| 73 HEI/HUSI REACTION ORDER: 2 $k/k_{ref}$: 3.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow$ products | | | | | | |
| $CO_2 + O + M \rightarrow CO_3 + M$ | | | | | | |
| CARBON DIOXIDE + OXYGEN ATOM | | | | | | |
| 71 STU/NIKI REACTION ORDER: 3 M: CO | 300 | <3.3(+12) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $CO_2 + OH(v=0) \rightarrow$ products | | | | | | |
| CARBON DIOXIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 1.4(+10) | - | - | 0.6 | 1.4 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| $CO_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| CARBON DIOXIDE + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.24 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| $CO_2 + N^*(^2D) \rightarrow$ products | | | | | | |
| CARBON DIOXIDE + NITROGEN ATOM | | | | | | |
| 71 LIN/KAU REACTION ORDER: 2 | 300 | 3.0(+11) | - | - | 0.6 | 1.4 |
| $CO_2 + C(^3P) \rightarrow$ products | | | | | | |
| CARBON DIOXIDE + CARBON ATOM | | | | | | |
| 75 HUS/YOU REACTION ORDER: 2 | 300 | <6.0(+8) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $CO_2 + {}^3CH_2 \rightarrow O_2 + HCHO$ | | | | | | |
| CARBON DIOXIDE + METHYLENE FREE RADICAL | | | | | | |
| 77 LAU/BAS REACTION ORDER: 2 | 298 | 2.3(+10) | - | - | 0.5 | 1.5 |
| $CO_2 + CN \rightarrow CO + CNO$ | | | | | | |
| CARBON DIOXIDE + CYANOGEN FREE RADICAL | | | | | | |
| 75 HAY/IVE REACTION ORDER: 2 | 1830-2400 | 3.7(+12) | 0 | 0 | 0.9 | 1.1 |
| $CO_2 + M \rightarrow CO + O + M$ | | | | | | |
| CARBON DIOXIDE | | | | | | |
| 73 DEA REACTION ORDER: 2 M: Ar | 3700-5600 | 6.3(+13) | 0 | 42640±930 | 0.8 | 1.2 |
| 74 HAR/VAS M: Ar | 3400-4400 | 2.7(+14) | 0 | 53345 | | |
| NOTE: AT LOW PRESSURES | | | | | | |
| 74 WAG/ZAB REACTION ORDER: 1 M: Ar | 3000-3700 | 9.0(+12) | 0 | 65300 | | |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| 74 WAG/ZAB REACTION ORDER: 2 | 3000-4600 | 5.1(+14) | 0 | 55600 | | |
| NOTE: LIMITING LOW-PRESSURE k. CONCENTRATION DEPENDENT ARRHENIUS EXPRESSION = k[Ar] | | | | | | |
| $CH + CO \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 71 BES/PER REACTION ORDER: 2 | 298 | 2.9(+12) | - | - | | |
| $CH + O_2 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BES/PER REACTION ORDER: 2 | 298 | 2.4(+13) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH + H_2 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 1.05(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH + H_2O \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + WATER | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 2.7(+13) | - | - | 0.9 | 1.2 |
| ---------- | | | | | | |
| $CH + N_2 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + NITROGEN MOLECULE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 6.1(+11) | - | - | 0.5 | 1.2 |
| ---------- | | | | | | |
| $CH + NH_3 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + AMMONIA | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 5.9(+10) | - | - | 0.8 | 1.1 |
| ---------- | | | | | | |
| $CH + CH_4 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + METHANE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 2.0(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH + CH{\equiv}CH \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + ETHYNE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 4.5(+13) | - | - | 0.9 | 1.2 |
| ---------- | | | | | | |
| $CH + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + ETHENE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 6.9(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH + CH_3CH_2CH_3 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + PROPANE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 8.2(+13) | - | - | 0.8 | 1.1 |
| ---------- | | | | | | |
| $CH + CH_3CH_2CH_2CH_3 \rightarrow$ products | | | | | | |
| METHYLIDYNE FREE RADICAL + BUTANE | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 7.8(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2 + O \rightarrow CO + H + H$ | | | | | | |
| METHYLENE FREE RADICAL + OXYGEN ATOM | | | | | | |
| 73 JEN/BAY1 REACTION ORDER: 2 $k/k_{ref}$: 3.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2 + CH{\equiv}CH \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_2 + O_2 \rightarrow CO_2 + H + H$ | | | | | | |
| METHYLENE FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 73 PIE/MAH2 REACTION ORDER: 2 | 1200-1600 | 1.0(+14) | 0 | 1860 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $^1CH^* + O_2 \rightarrow$ products | | | | | | |
| METHYLENE FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 1.8(+13) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k. (UPPER LIMIT) | | | | | | |
| ---------- | | | | | | |
| $CH_2 + O_2 \rightarrow$ products | | | | | | |
| METHYLENE FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 73 JEN/BAY2 REACTION ORDER: 2 | 296 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_2 + O \rightarrow CO + H + H$ | | | | | | |
| 74 LAU/BAS | 298 | 9.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: $^3CH_2$ (GROUND STATE). LIMITING HIGH PRESSURE k. | | | | | | |
| 75 PIE/VIN | 2000 | 1.2(+13) | - | - | | |
| 77 PIL/ROB | 298 | 7.2(+11) | - | - | | |
| NOTE: $^3CH_2$ (GROUND STATE) | | | | | | |
| ---------- | | | | | | |
| $^1CH_2^* + H_2 \rightarrow CH_3 + H$ | | | | | | |
| METHYLENE FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 77 PIL/ROB REACTION ORDER: 2 | 298 | 1.2(+13) | - | - | | |
| NOTE: $^1CH_2^*(^1B_1)$ STATE | | | | | | |
| ---------- | | | | | | |
| $^3CH_2 + H \rightarrow CH_3 + H$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| METHYLENE FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 77 PIL/ROB REACTION ORDER: 2 | 298 | 3.0(+9) | - | - | | |
| NOTE: $^3CH_2$ (GROUND STATE) | | | | | | |
| --- | | | | | | |
| $^3CH_2$ + NO → $CH_2NO$ | | | | | | |
| METHYLENE FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 77 PIL/ROB REACTION ORDER: 2 | 298 | 6.0(+12) | - | - | | |
| NOTE: $^3CH_2$ (GROUND STATE) | | | | | | |
| --- | | | | | | |
| $^1CH_2$ + NO → products | | | | | | |
| METHYLENE FREE RADICAL + NITROGEN OXID (NO) | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 2.4(+13) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k (UPPER LIMIT) | | | | | | |
| --- | | | | | | |
| $^3CH_2$ + NO → products | | | | | | |
| METHYLENE FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 9.6(+12) | - | - | 0.9 | 1.1 |
| NOTE: $^3CH_2$ (GROUND STATE). LIMITING HIGH PRESSURE k. | | | | | | |
| --- | | | | | | |
| --- | | | | | | |
| $^1CH_2^*$ + CO → products | | | | | | |
| METHYLENE FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 5.4(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k. (UPPER LIMIT) | | | | | | |
| --- | | | | | | |
| $^3CH_2$ + CO → products | | | | | | |
| METHYLENE FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 | 298 | 6.0(+8) | - | - | | |
| NOTE: $^3CH_2$ (GROUND STATE). LIMITING HIGH PRESSURE k (UPPER LIMIT) | | | | | | |
| --- | | | | | | |
| $^3CH_2$ + $CO_2$ → HCHO + $O_2$ | | | | | | |
| METHYLENE FREE RADICAL + CARBON DIOXIDE | | | | | | |
| 77 LAU/BAS REACTION ORDER: 2 | 298 | 2.3(+10) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $^3CH_2$ + $CH_3$ → $CH_2{=}CH_2$ + H | | | | | | |
| METHYLENE FREE RADICAL + METHYL FREE RADICAL | | | | | | |
| 75 PIL/ROB REACTION ORDER: 2 | 298 | 3.0(+13) | - | - | 0.6 | 1.4 |
| 75 LAU/BAS1 | 295 | 6.0(P13) | - | - | 0.8 | 1.3 |
| --- | | | | | | |
| $^3CH_2$ + CH≡CH → $CH_2{=}C{=}CH_2$ + $CH_3C{\equiv}CH$ | | | | | | |
| METHYLENE FREE RADICAL + ETHYNE | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 | 298 | 4.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: $^3CH_2$ (GROUND STATE). LIMITING HIGH PRESSURE k | | | | | | |
| 77 PIL/ROB | 298 | 2.4(+12) | - | - | | |
| NOTE: $^3CH_2$ (GROUND STATE) | | | | | | |
| --- | | | | | | |
| $CH_2$ + $CH_3CH_3$ → $CH_3CH_2CH_3$ | | | | | | |
| METHYLENE FREE RADICAL + ETHANE | | | | | | |
| 73 HAL/CRU REACTION ORDER: 2 | 304 | 2.9(+12) | - | - | | |
| --- | | | | | | |
| $^1CH_2^*$ + $CH_2{=}C{=}O$ → $CH_2{=}CH_2$ + CO | | | | | | |
| METHYLENE FREE RADICAL + ETHENONE | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 M: He | 298 | 1.9(+13) | - | - | 0.6 | 1.4 |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| METHYLENE FREE RADICAL + ETHENONE | | | | | | |
| 77 PIL/ROB | 298 | 2.1(+12) | - | - | | |
| 77 PIL/ROB | 298 | 1.8(+13) | - | - | | |
| NOTE: $^1CH_2^*(^1B_1)$ STATE | | | | | | |
| --- | | | | | | |
| $CD_2$ + $CD_2{=}C{=}O$ → $CD_2{=}CD_2$ + CO | | | | | | |
| METHYLENE-$d_2$ FREE RADICAL + ETHENONE-$d_2$ | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 | 653 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $CD_2 + (CH_3)_4C \rightarrow CD_2H + (CH_3)_3CCH_2\cdot$ | | | | | | |
| $CH_2 + CH_3CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_3$<br>METHYLENE FREE RADICAL + PROPANE<br>73 HAL/CRU REACTION ORDER: 2<br>NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.29 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN PROPANE | 304 | 2.7(+12) | - | - | | |
| $^1CH_2^* + CH_3CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_3$<br>METHYLENE FREE RADICAL + PROPANE<br>75 ZAB/CAR REACTION ORDER: 2 $k/k_{ref}$: 16.67<br>NOTE: $^1CH_2^*(^1A_1)$ STATE. $k_{ref}$: $CH_2^*(^1A_1) + M \rightarrow CH_2(^3B_1) + M$ | 298 | - | - | - | | |
| $CH_2 + CH_3CH_2CH_3 \rightarrow (CH_3)_3CH$<br>METHYLENE FREE RADICAL + PROPANE<br>73 HAL/CRU REACTION ORDER: 2<br>NOTE: EDITOR'S CALCULATION BASED REPORTED 1.29 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN PROPANE | 304 | 1.1(+12) | - | - | | |
| $^1CH_2^* + CH_2{=}CHCH{=}CH_2 \rightarrow$ cis-, and trans-$CH_2{=}CHCH{=}CHCH_3$ + $CH_2{=}C(CH_3)CH{=}CH_2$<br>METHYLENE FREE RADICAL + 1,3-BUTADIENE<br>75 CRA/ROS REACTION ORDER: 2 $k/k_{ref}$: 0.14<br>NOTE: $k_{ref}$: $^1CH_2 + CH_2{=}CHCH{=}CH_2 \rightarrow$ cy-$[CH_2{=}CH]CHCH_2CH_2$ [CYCLOPROPANE, ETHENYL-] | 298 | - | - | - | | |
| $^1CH^* + CH_3CH_2CH_2CH_3 \rightarrow (CH_3)_2CHCH_2CH_3^*$<br>METHYLENE FREE RADICAL + BUTANE<br>72 GRO/HAS REACTION ORDER: 2 $k/k_{ref}$: 0.89<br>NOTE: $k_{ref}$: $^1CH_2^* + CH_3CH_3 \rightarrow CH_3CH_2CH_3^*$ | 298 | - | - | - | | |
| $CH_2 + CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2CH_3$<br>METHYLENE FREE RADICAL + BUTANE<br>73 HAL/CRU REACTION ORDER: 2<br>NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.31 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN BUTANE | 304 | 2.6(+12) | - | - | | |
| $CH_2 + CH_3CH_2CH_2CH_3 \rightarrow (CH_3)_2CHCH_2CH_3$<br>METHYLENE FREE RADICAL + BUTANE<br>73 HAL/CRU REACTION ORDER: 2<br>NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.31 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN BUTANE | 304 | 2.3(+12) | - | - | | |
| $CH_2 + (CH_3)_3CH \rightarrow (CH_3)_2CHCH_2CH_3$<br>METHYLENE FREE RADICAL + PROPANE,2-METHYL-<br>73 HAL/CRU REACTION ORDER: 2<br>NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.33 EFFICIENCY OF $CH_2$ INSERTION AT TERTIARY OVER PRIMARY CH BONDS IN 2-METHYLPROPANE | 304 | 3.9(+12) | - | - | | |
| $CH_2 + (CH_3)_3CH \rightarrow (CH_3)_4C$<br>METHYLENE FREE RADICAL + PROPANE,2-METHYL-<br>73 HAL/ORU REACTION ORDER: 2<br>NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.33 EFFICIENCY OF $CH_2$ INSERTION AT TERTIARY OVER PRIMARY CH BONDS IN 2-METHYLPROPANE | 304 | 5.9(+11) | - | - | | |
| $^1CH_2^* + CH_3CH_2CH_2CH_2CH_3 \rightarrow CH_3(CH_2)_4CH_3$<br>METHYLENE FREE RADICAL + PENTANE<br>75 [illegible]B/CAR REACTION ORDER: 2 $k/k_{ref}$: 11.11 | 298 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $^1CH_2^*(^1A_1)$ STATE. $k_{ref}$: $CH_2^*(^1A_1) + M \rightarrow CH(^3B_1) + M$ | | | | | | |
| ---------- | | | | | | |
| $CD_2 + (CH_3)_4C \rightarrow CD_2H + (CH_3)_3CCH_2\cdot$ | | | | | | |
| METHYLENE-$d_2$ FREE RADICAL + PROPANE, 2,2-DIMETHYL- | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 $k/k_{ref}$: 2.1 | 576-706 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CD_2 + CD_2{=}C{=}O \rightarrow CD_3 + .CD{=}C{=}O$ | | | | | | |
| ---------- | | | | | | |
| $CD_2 + (CH_3)_4C \rightarrow CD_2H + (CH_3)_3CCH_2\cdot$ | | | | | | |
| METHYLENE-$d_2$ FREE RADICAL + PROPANE, 2,2-DIMETHYL- | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 | 653 | 1.5(+11) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3 + O \rightarrow HCHO + H$ | | | | | | |
| METHYL FREE RADICAL + OXYGEN ATOM | | | | | | |
| 72 NIK/MOR2 REACTION ORDER: 2 | 300 | 5.4(+13) | - | - | | |
| 73 MOR/NIK1 REACTION ORDER: 2 | 298 | 1.8(+13) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298K. LOWER LIMIT k | | | | | | |
| 73 PEE/MAH | 1100-1900 | 1.3(+14) | 0 | 1000 | | |
| 73 WAS/BAY | 297 | 7.4(+13) | - | - | | |
| ---------- | | | | | | |
| 74 SIA/PRU | 300 | 1.1(+14) | - | - | 0.8 | 1.2 |
| 75 BIO/LAZ | 1550-1725 | 1.1(+14) | 0 | 0 | | |
| 75 BOW | 1900-2400 | 1.0(+14) | 0 | 0 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| 76 WAS/BAY | 259-341 | 6.0(+13) | 0 | 0 | 0.8 | 1.2 |
| 76 TSU | 1500-2000 | 6.0(+13) | 0 | 0 | | |
| ---------- | | | | | | |
| $CH_3 + O_2 \rightarrow HCHO + OH$ | | | | | | |
| METHYL FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BOW REACTION ORDER: 2 | 1900-2400 | 1.2(+11) | 0 | 5000 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| 76 WAS/BAY | 259-341 | 1.7(+11) | 0 | 940±250 | 0.4 | 2.2 |
| 76 TSU | 1500-2000 | 9.0(+11) | 0 | 6000 | | |
| ---------- | | | | | | |
| $CH_3\cdot + O_2 \rightarrow CH_3O\cdot + O$ | | | | | | |
| METHYL FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BRA/BRO REACTION ORDER: 2 | 1200-1800 | 2.4(+13) | 0 | 14500 | | |
| ---------- | | | | | | |
| $CH_3 + O_2 + M \rightarrow CH_3O_2\cdot + M$ | | | | | | |
| METHYL FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 VAN/CAL REACTION ORDER: 2 | 295 | 1.1(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k. GIVEN WITH CAUTION. | | | | | | |
| $M{=}CH_3CH_2CH_3$ | | | | | | |
| 72 EAS/JAM | 295 | 3.1(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE k. M: $N_2$, OR $(CH_3)_4C$ | | | | | | |
| REACTION ORDER: 3 | 295 | 3.6(+17) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k. $M{=}(CH_3)_4C$ | | | | | | |
| M: $N_2$ | 295 | 9.4(+16) | - | - | 0.9 | 1.1 |
| NOTE: LOW PRESSURE k | | | | | | |
| 73 SOK/NIK M: He | | 3.9(+16) | - | - | | |
| NOTE: LOW PRESSURE k | | | | | | |
| REACTION ORDER: 2 M: He | 453 | 1.5(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 75 LAU/BAS2 | 298 | 1.0(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k M:He,Ar,$N_2$. | | | | | | |
| 77 HOC/GRO M: $N_2$ | 295 | 1.3(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 77 FAR REACTION ORDER: 3 M: $N_2$ | 298 | 1.1(+17) | - | - | 0.7 | 1.3 |
| NOTE: LOW PRESSURE k | | | | | | |
| 77 FAR REACTION ORDER: 2 M: $N_2$ | 298 | 7.2(+11) | - | - | 0.3 | 1.7 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 77 FAR REACTION ORDER: 3 | 298 | 5.4(+17) | - | - | 0.5 | 1.5 |
| NOTE: LOW PRESSURE k. $M{=}(CH_3)_4C$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + O_3 \rightarrow HCHO + H + O_2$ | | | | | | |
| METHYL FREE RADICAL + OZONE | | | | | | |
| 75 SIM/HEI REACTION ORDER: 2 | 221-298 | 3.3(+12) | - | 530 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3 + H \rightarrow CH_4$ | | | | | | |
| METHYL FREE RADICAL + HYDROGEN ATOM4 | | | | | | |
| 72 TEN/JON REACTION ORDER: 2 | 303-603 | 1.2(+12) | 0 | 25 | | |
| 74 CAM/MAR | 503-753 | 1.6(+12) | 0 | 0 | 0.7 | 1.3 |
| NOTE: AVERAGE OF THREE k,S AT 8,12, AND 16 TORR. | | | | | | |
| 77 CHE/LEE | 308 | 1.5(14) | - | - | | |
| 77 CHE/YEH | 308 | 2.0(+14) | - | - | 0.6 | 1.5 |
| NOTE: EXTRAPOLATED LIMITING HIGH PRESSURE k | | | | | | |
| $CH_3 + H + M \rightarrow CH_4 + M$ | | | | | | |
| METHYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 74 PRA/VEL REACTION ORDER: 3 M: He | 295 | 5.3(+18) | - | - | 0.8 | 1.2 |
| M: N0 | 295 | 2.0(+20) | - | - | 0.9 | 1.1 |
| 76 PRA/VEL1 M: He | 321-521 | 6.9(+19) | -0.33 | 0 | 0.2 | 5.0 |
| $CH_3\cdot + H_2 \rightarrow CH_4 + H$ | | | | | | |
| METHYL FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3\cdot + D_2 \rightarrow CH_3D + D.$ $k/k_{ref}$: 0.911 exp(+688/T) | | | | | | |
| 73 CIA/DOV2 REACTION ORDER: 2 | 1200-2000 | 1.5(+13) | 0 | 7800 | 0.5 | 2.0 |
| NOTE: EVALUATION BASED ON AN EXPERIMENTAL | | | | | | |
| $k = (4.6 \pm 1.4) \times 10^{10} cm^3 mol^{-1} s^{-1}$ AT 1340K | | | | | | |
| 74 KOB/PAC | 372-1370 | 7.9(+5) | 2.0 | 4810 | | |
| $CH_3^* + H_2 \rightarrow CH_4 + H$ | | | | | | |
| 73 TIN/WES $k/k_{ref}$: 0.75 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_3^*\cdot + CH_3Br \rightarrow CH_4 + .CH_2Br$ | | | | | | |
| $CH_3\cdot + HD \rightarrow CH_4 + D$ | | | | | | |
| METHYL FREE RADICAL + DEUTERIUM HYDRIDE | | | | | | |
| 72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3\cdot + DH \rightarrow CH_3D + H.$ $k/k_{ref}$: 0.283 exp(+970/T) | | | | | | |
| $CH_3 + D_2 \rightarrow CH_3D + D$ | | | | | | |
| METHYL FREE RADICAL + DEUTERIUM MOLECUME | | | | | | |
| 76 PRA/ROG2 REACTION ORDER: 2 | 300-1118 | 1.6(+12) | 0 | 6370±40 | 0.9 | 1.1 |
| 77 YAN $k/k_{ref}$: 0.34 | 1260-1390 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CH{=}CH_2 \rightarrow CH_4 + .CH_2CH{=}CH_2$ | | | | | | |
| $CH_3^*\cdot + D_2 \rightarrow CH_3D + D$ | | | | | | |
| METHYL FREE RADICAL + DEUTERIUM MOLECULE | | | | | | |
| 73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 0.05 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3^*\cdot + CH_3Br \rightarrow CH_4 + .CH_2Br$ | | | | | | |
| $CD_3\cdot + H_2 \rightarrow CD_3H + H$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $CD_3 + D_2 \rightarrow CD_4 + D.$ $k/k_{ref}$: 1.592 exp(+296/T) | | | | | | |
| $CD_3^* + H_2 \rightarrow CD_3H + H$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 0.093 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CD_3^* + CD_3Br \rightarrow CD_4 + CD_2Br$ | | | | | | |
| $CD_3\cdot + HD \rightarrow CD_3H + D$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + DEUTERIUM HYDRIDE | | | | | | |
| 72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $CD_3 + DH \rightarrow CD_4 + H.$ $k/k_{ref}$: 0.932 exp(+275/T) | | | | | | |
| $CD_3^* + D_2 \rightarrow CD_4 + D$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + DEUTERIUM MOLECULE | | | | | | |
| 73 TIN/WES REACTION ORDER: 2 $k/k_{ref}$: 2.15 | 298 | - | - | - | 0.6 | 1.4 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $CD_3^* + H_2 \rightarrow CD_3H + H$ | | | | | | |
| --- | | | | | | |
| $CH_3 + SO_2 + M \rightarrow CH_3SO_2 + M$ | | | | | | |
| METHYL FREE RADICAL + SULFUR DIOXIDE | | | | | | |
| 73 JAM/KER REACTION ORDER: 2 | 298 | 1.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | |
| --- | | | | | | |
| $CH_3 + NO \rightarrow CH_3NO$ | | | | | | |
| METHYL FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 72 DAV/COR REACTION ORDER: 2 $k/k_{ref}$: 0.62 | 295 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3\cdot + NO_2 \rightarrow CH_3NO_2$ | | | | | | |
| --- | | | | | | |
| $CH_3 + NO + M \rightarrow CH_3NO + M$ | | | | | | |
| METHYL FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 71 VAN/CAL REACTION ORDER: 2 | 295 | 1.0(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE k. $M=N_2$, OR $CH_3CH_2CH_3$ | | | | | | |
| 74 PRA/VEL REACTION ORDER: 3 M: He | 295 | 1.0(+17) | - | - | 0.9 | 1.1 |
| 74 TIT/BAL REACTION ORDER: 2 | 443 | 1.8(+12) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k. $M=(CH_3)_2CO$. | | | | | | |
| REACTION ORDER: 3 | 443 | 6.1(+18) | - | - | | |
| NOTE: $k_0$ (LOW PRESSURE). $M=(CH_3)_2CO$ | | | | | | |
| 75 LAU/BAS2 REACTION ORDER: 2 | 298 | 1.9(+13) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k. $M=He, Ar, N_2$ | | | | | | |
| --- | | | | | | |
| 76 FIL/ROB | 298 | 7.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k. M=Ar, or $SF_6$ | | | | | | |
| 76 PRA/VEL2 REACTION ORDER: 3 M: He | 325-521 | 7.2(+16) | 0 | -210±10 | 0.8 | 1.2 |
| --- | | | | | | |
| $CH_3 + NO_2 \rightarrow CH_3ONO$ | | | | | | |
| METHYL FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 72 DAV/COR REACTION ORDER: 2 $k/k_{ref}$: 2.17 | 295 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + NO_2 \rightarrow CH_3NO_2$. | | | | | | |
| $k/k_{ref}$: [METHYL NITRITES]/[NITRO METHANE] | | | | | | |
| --- | | | | | | |
| $CH_3 + NO_2 \rightarrow CH_3O\cdot + NO$ | | | | | | |
| METHYL FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 74 GIA/TRO2 REACTION ORDER: 2 | 1100-1400 | 1.3(+13) | 0 | 0 | | |
| --- | | | | | | |
| $CH_3 + NO_2 + M \rightarrow CH_3NO_2 + M$ | | | | | | |
| METHYL FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 74 GIA/TRO2 REACTION ORDER: 2 M: Ar | 300-1400 | 6.3(+14) | -0.6 | 0 | | |
| NOTE: LIMITING HIGH PRESSURE k REACTION ORDER: 3 M: Ar | 300-1400 | 2.5(+35) | -6 | 0 | | |
| NOTE: LOW PRESSURE k | | | | | | |
| --- | | | | | | |
| $CH_3 + N_2O \rightarrow CH_3O + N_2$ | | | | | | |
| METHYL FREE RADICAL + NITROGEN OXIDE($N_2O$) | | | | | | |
| 73 FAL/HOA REACTION ORDER: 2 | 873 | 1.4(+7) | - | - | 0.8 | 1.2 |
| 77 BOR/ZAM REACTION ORDER: 2 | 1000-2000 | 1.0(+15) | 0 | 14280 | | |
| NOTE: UPPER LIMIT k (EVALUATION) | | | | | | |
| --- | | | | | | |
| $CH_3 + CO \rightarrow CH_3O$ | | | | | | |
| METHYL FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 74 WAT/WIL REACTION ORDER: 2 | 260-296 | 1.6(+11) | 0 | 3000±15 | 0.6 | 1.6 |
| --- | | | | | | |
| $CH_3 + {}^3CH_2 \rightarrow H + CH_2{=}CH_2$ | | | | | | |
| METHYL FREE RADICAL + METHYLENE FREE RADICAL | | | | | | |
| 75 FIL/ROB REACTION ORDER: 2 | 298 | 3.0(+13) | - | - | 0.6 | 1.4 |
| 75 LAU/BAS1 | 295 | 6.0(+13) | - | - | 0.8 | 1.3 |
| --- | | | | | | |
| $CH_3^* + CH_3 \rightarrow CH_4 + CH_2$ | | | | | | |
| METHYL FREE RADICAL | | | | | | |
| 77 RIC/TRU REACTION ORDER: 2 | 298 | <1.0(+14) | - | - | | |
| NOTE: UPPER LIMIT k. UNREPORTED T ASSUMED TO BE 298K IN Ar CARRIER GAS | | | | | | |
| --- | | | | | | |

| CHEMICAL REACTIONS | | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|---|
| $CH_3 + CH_3 \rightarrow CH_2{=}CH_2 + H_2$ | | | | | | | |
| METHYL FREE RADICAL | | | | | | | |
| 75 GAR/OWE | REACTION ORDER: 2 | 2000-2700 | 6.0(+16) | 0 | 21700 | | |
| $CH_3\cdot + CH_3\cdot \rightarrow CH_3CH_3$ | | | | | | | |
| METHYL FREE RADICAL | | | | | | | |
| 72 TEN/JON | REACTION ORDER: 2 | 303-603 | 2.6(+13) | 0 | 215 | | |
| 73 EAY/BRO | | 295 | 2.4(+13) | - | - | 0.9 | 1.1 |
| NOTE: TENTATIVE k | | | | | | | |
| 74 PEH/LEI | | 298 | 2.7(+13) | - | - | 0.9 | 1.1 |
| 76 CAL/MET | | 295 | 3.3(+13) | - | - | 0.9 | 1.1 |
| 76 PAR/PAU | | 250-450 | 2.4(+13) | - | - | 0.8 | 1.2 |
| $CD_3 + CD_3 \rightarrow CD_3CD_3$ | | | | | | | |
| METHYL-$d_3$ FREE RADICAL | | | | | | | |
| 76 CAL/MET | REACTION ORDER: 2 | 295 | 3.0(+13) | - | - | 0.9 | 1.1 |
| 76 PAR/PAU | | 298 | 2.4(+13) | - | - | 0.6 | 1.4 |
| $CH_3 + CH_3 + M \rightarrow CH_3CH_3 + M$ | | | | | | | |
| 73 EAS/LAU | REACTION ORDER: 2 M: He | 298 | 5.7(+13) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING-HIGH-PRESSURE k | | | | | | | |
| 73 TRU/RIC | M: $N_2$ | 313 | 2.4(+13) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| 74 JAM/SIM | M: Ar | 298 | 3.4(+13) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| 76 GIA/QUA | M: Ar | 1200-1500 | 1.0(+13) | 0 | 0 | 0.6 | 1.4 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| 77 GIA/QUA | M: Ar | 1400 | 1.7(+13) | - | - | 0.5 | 1.5 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| 76 VAN | REACTION ORDER: 3 M: He | 450 | 7.4(+21) | - | - | | |
| NOTE: LOW PRESSURE k | | | | | | | |
| | M: Ar | 1350 | 2.8(+19) | - | - | 0.5 | 2.0 |
| NOTE: LOW PRESSURE k | | | | | | | |
| 77 BOC/GBO | REACTION ORDER: 2 M: $N_2$ | 295 | 3.1(+13) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | | |
| $CD_3 + CD_3 + M \rightarrow CD_3CD_3 + M$ | | | | | | | |
| METHYL-$d_3$ FREE RADICAL | | | | | | | |
| 76 GIA/QUA | REACTION ORDER: 2 M: Ar | 1200-1500 | 1.3(+13) | 0 | 0 | 0.6 | 1.4 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| | M: Ar | 400 | 1.9(+13) | - | - | 0.5 | 1.5 |
| NOTE: LIMITING HIGH-PRESSURE k | | | | | | | |
| 76 VAN | REACTION ORDER: 3 M: Ar | 1350 | 7.7(+19) | - | - | | |
| NOTE: LOW PRESSURE k | | | | | | | |
| $CH_3 + CH_3O_2\cdot \rightarrow CH_3O\cdot + CH_3O\cdot$ | | | | | | | |
| METHYL FREE RADICAL + METHYLDIOXY FREE RADICAL | | | | | | | |
| 77 PAR | REACTION ORDER: 2 | 298 | 3.6(+13) | - | - | 0.8 | 1.2 |
| $CD_3 + COS \rightarrow CD_3S\cdot + CO$ | | | | | | | |
| METHYL-$d_3$ FREE RADICAL + CARBON OXIDE SULFIDE | | | | | | | |
| 72 JAK/AHM | REACTION ORDER: 2 | 354-490 | 3.8(+11) | 0 | 5710±175 | 0.6 | 1.8 |
| NOTE: EVALUATION | | | | | | | |
| $CH_3 + CH_3N{=}NH \rightarrow CH_4 + CH_3N{=}N\cdot$ | | | | | | | |
| METHYL FREE RADICAL + DIAZENE, METHYL- | | | | | | | |
| 76 VID/WIL | REACTION ORDER: 2 | 294 | 1.3(+10) | - | - | 0.. | 1.1 |
| $CH_3\cdot + CH{\equiv}CH \rightarrow CH_3CH{=}CH\cdot$ | | | | | | | |
| METHYL FREE RADICAL + ETHYNE | | | | | | | |
| 77 HOL/KER | REACTION ORDER: 2 | 379-487 | 6.2(+11) | 0 | 3880±750 | 0.2 | 6.3 |
| NOTE: EVALUATION | | | | | | | |
| $CH_3 + CH_2{=}CH_2 \rightarrow CH_4 + CH_2{=}CH\cdot$ | | | | | | | |
| METHYL FREE RADICAL + ETHENE | | | | | | | |
| 76 CHE/BAC | REACTION ORDER: 2 | 1038 | 1.0(+9) | - | - | | |
| NOTE: EVALUATION | | | | | | | |
| $CH_3\cdot + CH_2{=}CH_2 \rightarrow CH_3CH_2CH_2\cdot$ | | | | | | | |
| METHYL FREE RADICAL + ETHENE | | | | | | | |
| 72 TUD/WAL | REACTION ORDER: 2 | 335-424 | - | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: $CH_3 + CH_2{=}CHF \rightarrow CH_3CH_2CHF$. | | | | | | |
| $k/k_{ref}$: $7.2\times10^{2}$ exp(+468±100/T) | 335-424 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_3 + CH_2{=}CF_2 \rightarrow CH_3CH_2CF_2$. | | | | | | |
| $k/k_{ref}$: $4.9\times10^{1}$ exp(+2420±500/T) | 335-424 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_3$. $+ CF_2{=}CF_2 \rightarrow CH_3CF_2CF_2$. | | | | | | |
| $k/k_{ref}$: $8.3\times10^{3}$ exp(-1.320±550/T) | 335-424 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3 + CH_2{=}CHCl \rightarrow CH_3CH_2CHCl$. | | | | | | |
| $k/k_{ref}$: $2.9\times10^{2}$ exp(+940±250/T) | 335-424 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3 + CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(.)CH_3$: | | | | | | |
| $k/k_{ref}$: $1.1\times10^{4}$ exp(+377±200/T) | 350-500 | 2.1(+11) | 0 | 3670±500 | 0.3 | 3.2 |
| 77 BOL/KER | | | | | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2$. $\rightarrow CH_3CH_2CH_3$ | | | | | | |
| METHYL FREE RADICAL + ETHYL FREE RADICAL | | | | | | |
| 72 TEN/JEN REACTION ORDER: 2 | 303-603 | 2.5(+13) | 0 | 200 | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_3 \rightarrow CH_4 + CH_3CH_2$. | | | | | | |
| METHYL FREE RADICAL + ETHANE | | | | | | |
| 72 FAC/PUR2 REACTION ORDER: 2 | 920-1040 | 5.0(+14) | 0 | 10830±2410 | 0.1 | 10. |
| 73 CLA/DOV1 | 300-1800 | 5.5(-1) | 4.0 | 4170±15 | 0.9 | 1.1 |
| 74 YAM/RYB | 980-1130 | 3.0(+12) | 0 | 6840±1100 | | |
| 76 ERA/WES2 | 1055-1325 | 3.2(+13) | 0 | 9000 | 0.6 | 1.8 |
| 76 CHE/BAC | 1038 | 1.3(+10) | - | - | 0.8 | 1.2 |
| NOTE: MEASURED k VALUES ALSO AT T=880K, 995K AND 1068K. NON-ARRHENIUS BEHAVIOR | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CHO \rightarrow CH_4 + CH_3C(O)$. | | | | | | |
| METHYL FREE RADICAL + ACETALDEHYDE | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713-813 | 1.6(+12) | 0 | 4125±250 | 0.6 | 1.4 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CHO \rightarrow CH_4 + CH_3C(O)$. $+ .CH_2CHO$ | | | | | | |
| METHYL FREE RADICAL + ACETALDEHYDE | | | | | | |
| 76 EAR/BER REACTION ORDER: 2 $k/k_{ref}$: 2.7 | 785 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CDO \rightarrow CH_3D + CH_3C(O)$. | | | | | | |
| ---------- | | | | | | |
| $CH_3$. $+ CH_3CDO \rightarrow CH_4 + .CH_2CDO$ | | | | | | |
| METHYL FREE RADICAL + ACETALDEHYDE-1-d | | | | | | |
| 76 EAR/BER REACTION ORDER: 2 $k/k_{ref}$: 0.62 | 785 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CDO \rightarrow CH_3D + CH_3C(O)$. | | | | | | |
| ---------- | | | | | | |
| $CH_3 + (CH_3)_2O \rightarrow CH_4 + .CH_2OCH_3$ | | | | | | |
| METHYL FREE RADICAL + METHANE, OXYBIS- | | | | | | |
| 75 PAC REACTION ORDER: 2 | 782-936 | 3.2(+13) | 0 | 7600±840 | 0.4 | 2.5 |
| NOTE: CURVED ARRHENIUS PLOT OVER EXTENDED T RANGE 373-936K | | | | | | |
| ---------- | | | | | | |
| $CH_3 + cy\text{-}CH_2CH_2S \rightarrow CH_3S. + CH_2{=}CH_2$ | | | | | | |
| METHYL FREE RADICAL + THIIRANE | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 304-478 | 7.1(+10) | 0 | 3370±400 | 0.3 | 3.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CD_3 + cy\text{-}CH_2CH_2S \rightarrow CD_3H + cy\text{-}CH_2{=}CH(.)S$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + THIIRANE | | | | | | |
| 71 JAK/AHM REACTION ORDER: 2 | 303-477 | 2.2(+11) | 0 | 4800±500 | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CD_3 + cy\text{-}CH_2CH_2S \rightarrow CD_3S. + CH_2{=}CH_2$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + THIIRANE | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 303-477 | 5.9(+10) | 0 | 3270±500 | 0.2 | 4.4 |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3 + (CH_3)_2S \rightarrow CH_4 + CH_3SCH_2.$<br>METHYL FREE RADICAL + METHANE, THIOBIS-<br>76 ART/LEE REACTION ORDER: 2 | 393-518 | 4.2(+11) | 0 | 4613±82 | | |
| ---------- | | | | | | |
| $CH_3 + CH_3N{=}NCH_3 \rightarrow CH_4 + .CH_2N{=}NCH_3$<br>METHYL FREE RADICAL + DIAZENE, DIMETHYL-<br>77 SCH/KNO<br>NOTE: $k_{ref}$: $CH_3 + CD_3COCOCD_3 \rightarrow CH_3D + .CD_2COCOCD_3$<br>$k/k_{ref}$: 1.0exp(+600±300/T) | | - | - | - | 0.5 | 2.0 |
| ---------- | | | | | | |
| $CD_3 + CH_3N{=}NCH_3 \rightarrow CD_3H + .CH_2N{=}NCH_3$<br>METHYL-$d_3$ FREE RADICAL + DIAZENE, DIMETHYL-<br>77 SCH/KNO REACTION ORDER: 2<br>NOTE: $k_{ref}$: $CD_3 + CD_3COCOCD_3 \rightarrow CD_4 + .CD_2COCOCD_3$<br>$k/k_{ref}$: 0.63exp(+750±300/T) | 524-565 | - | - | - | 0.5 | 2.0 |
| ---------- | | | | | | |
| $CH_3 + CH_2{=}C{=}CH_2 \rightarrow .CH_2C(CH_3){=}CH_2$<br>METHYL FREE RADICAL + 1,2-PROPADIENE<br>73 TSA REACTION ORDER: 2 | 1100 | 1.6(+11) | 0 | 2500 | | |
| ---------- | | | | | | |
| $CH_3. + CH_3CH_2CH_3 \rightarrow CH_4 + CH_3CH_2CH_2. + (CH_3)_2CH.$<br>METHYL FREE RADICAL + PROPANE<br>75 CAM/MAR REACTION ORDER: 2 | 676-743<br>743-813<br>1050-1250 | 2.0(+12)<br>5.0(+15)<br>3.5(+12) | 0<br>0<br>0 | 5690±820<br>11600±900<br>5185 | 0.3<br>0.3 | 3.0<br>3.0 |
| 75 LIF/FREI | | | | | | |
| ---------- | | | | | | |
| $CH_3. + CH_3COCHO \rightarrow CH_4 + CH_3C(O). + CO$<br>METHYL FREE RADICAL + PROPANAL, 2-OXO-<br>77 KYL/ORC REACTION ORDER: 2 | 353 | 1.4(+11) | 0 | 3330±340 | 0.4 | 2.4 |
| ---------- | | | | | | |
| $CH_3. + (CH_3)_2CO \rightarrow CH_4 + .CH_2COCH_3$<br>METHYL FREE RADICAL + 2-PROPANONE<br>72 SHA/WES REACTION ORDER: 2<br>NOTE: $k_{ref}$: $CH_3 + D_2 \rightarrow CH_3D + D.$ $k/k_{ref}$: 0.617 exp(+1020/T) | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3. + DH \rightarrow CH_3D + H.$ $k/k_{ref}$=2.30 exp(+413/T) | 398-718 | - | - | - | | |
| 76 ART/LEE | 393-518 | 4.1(+11) | 0 | 4870±55 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CD_3. + (CD_3)_2CO \rightarrow CD_4 + .CD_2COCD_3$<br>METHYL-$d_3$ FREE RADICAL + 2-PROPANONE-1,1,1,3,3,3-$d_6$<br>72 SHA/WES REACTION ORDER: 2<br>NOTE: $k_{ref}$: $CD_3. + HD \rightarrow CD_3H + D.$ $k/k_{ref}$: 1.47 exp(-340/T) | 398-718 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3 + (CH_3)_2CO \rightarrow (CH_3)_3CO.$<br>METHYL FREE RADICAL + 2-PROPANONE<br>71 CAD/TRO REACTION ORDER: 2<br>NOTE: $k_1 = k_{-1}$ K | 373-423 | 1.7(+9) | 0 | 6770±900 | 0.1 | 10.0 |
| ---------- | | | | | | |
| $CH_3 + cy\text{-}(CH_3)CHCH_2S \rightarrow CH_4 + cy\text{-}[(CH_2.)CH{=}CH_2]S$<br>METHYL FREE RADICAL + THIIRANE, METHYL-<br>72 JAK/ARM REACTION ORDER: 2<br>NOTE: EVALUATION | 339-435 | 1.0(+11) | 0 | 4160±440 | 0.3 | 3.0 |
| ---------- | | | | | | |
| $CH_3 + cy\text{-}(CH_3)CHCH_2S \rightarrow CH_3S. + CH_3CH{=}CH_2$<br>METHYL FREE RADICAL + THIIRANE, METHYL-<br>72 JAK/ARM REACTION ORDER: 2<br>NOTE: EVALUATION | 339-435 | 2.1(+11) | 0 | 3750±830 | 0.1 | 8.3 |
| ---------- | | | | | | |
| $CH_3 + CH_2{=}CHCH{=}CH_2 \rightarrow CH_2{=}CHCH(CH_3)CH_2.$<br>METHYL FREE RADICAL + 1,3-BUTADIENE<br>74 CAR/TAR REACTION ORDER: 2 | 298 | - | - | 6050±500 | | |
| ---------- | | | | | | |
| $CH_3 + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_4 + .CH_2CH{=}CHCH_3$<br>METHYL FREE RADICAL + trans-2-BUTENE<br>73 RIC/MAR REACTION ORDER: 2 $k/k_{ref}$: ~8.0<br>NOTE: $k_{ref}$: $CH_3. + CH_3CHO \rightarrow CH_4 + CH_3C(O).$ | 768 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3$ + $.CH_2C(CH_3)=CH_2$ → $CH_3CH_2C(CH_3)=CH_2$ | | | | | | |
| METHYL FREE RADICAL + 2-PROPENYL, 2-METHYL-, FREE RADICAL | | | | | | |
| 73 TSA REACTION ORDER: 2 | 1020 | 2.0(+13) | - | - | | |
| ---------- | | | | | | |
| $CH_3$ + $(CH_3)_2C=CH_2$ → $CH_4$ + $.CH_2C(CH_3)=CH_2$ | | | | | | |
| METHYL FREE RADICAL + 1-PROPENE, 2-METHYL- | | | | | | |
| 73 KEN/MAR REACTION ORDER: 2 | 770-855 | 1.1(+14) | 0 | 8860 | | |
| NOTE: EVALUATION | | | | | | |
| 73 RIC/MAR $k/k_{ref}$: ~5.0 | 768 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3$. + $CH_3CHO$ → $CH_4$ + $CH_3C(O)$. | | | | | | |
| 76 BRA/WES2 | 1055-1325 | 6.8(+13) | 0 | 9860 | 0.6 | 1.6 |
| ---------- | | | | | | |
| $CH_3$ + $(CH_3)_3C$. → $(CH_3)_4C$ | | | | | | |
| METHYL FREE RADICAL + ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 72 MAR/PUR REACTION ORDER: 2 | 756-845 | 7.9(+12) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3$ + $CH_3CH_2CH_2CH_3$ → $CH_4$ + $CH_3CH_2CH_2CH_2$. | | | | | | |
| METHYL FREE RADICAL + BUTANE | | | | | | |
| 75 YAM REACTION ORDER: 2 | 980-1060 | 5.0(+11) | 0 | 6845 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3$ + $CH_3CH_2CH_2CH_3$ → $CH_4$ + $CH_3CH(.)CH_2CH_3$ | | | | | | |
| METHYL FREE RADICAL + BUTANE | | | | | | |
| 75 YAM REACTION ORDER: 2 | 980-1060 | 4.3(+11) | 0 | 5285 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3$ + $CH_3CH_2CH_2CH_3$ → $CH_4$ + $CH_3CH_2CH(.)CH_3$ + $CH_3CH_2CH_2CH_2$. | | | | | | |
| METHYL FREE RADICAL + BUTANE | | | | | | |
| 75 YAM REACTION ORDER: 2 | 980-1060 | 3.2(+12) | 0 | 5585±1000 | 0.4 | 2.6 |
| 72 PAC/PUR1 | 869-952 | 2.5(+14) | 0 | 9160±1600 | 0.2 | 6.3 |
| 74 BUG/MAR | 895-981 | 3.2(+13) | 0 | 7430±1800 | 0.1 | 7.9 |
| 76 YAM/NAM | 980-1060 | 3.2(+12) | 0 | 5590±1000 | 0.4 | 2.6 |
| ---------- | | | | | | |
| $CH_3$ + $(CH_3)_3CH$ → $CH_4$ + $(CH_3)_2CHCH_2$. | | | | | | |
| METHYL FREE RADICAL + PROPANE, 2-METHYL- | | | | | | |
| 73 KEN/MAR REACTION ORDER: 2 | 770-855 | 1.4(+13) | 0 | 8200 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3$ + $(CH_3)_3CH$ → $CH_4$ + $(CH_3)_3C$. | | | | | | |
| METHYL FREE RADICAL + PROPANE, 2-METHYL- | | | | | | |
| 73 KEN/MAR REACTION ORDER: 2 | 770-855 | 3.2(+12) | 0 | 6490 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3$ + $CD_3COCOCD_3$ → $CD_3$ + $CH_3COCOCD_3$ | | | | | | |
| METHYL FREE RADICAL + 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.4 | 2.5 |
| NOTE: $k_{ref}$: $CH_3$ + $CD_3COCOCD_3$ → $CD_3C(O)$. + $CH_3COCD_3$ | | | | | | |
| $k/k_{ref}$: 3.16exp(-3120±450/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3$ + $CH_3COCOCH_3$ → $CH_4$ + $.CH_2COCOCH_3$ | | | | | | |
| METHYL FREE RADICAL + 2,3-BUTANEDIONE | | | | | | |
| 73 KNO/SCH REACTION ORDER: 2 | 240-277 | 3.2(+11) | 0 | 4180 | | |
| NOTE: EVALUATION | | | | | | |
| 75 SCH/PLA | 822-905 | 7.9(+11) | 0 | 4730 | | |
| ---------- | | | | | | |
| $CH_3$ + $CH_3COCOCH_3$ → $CH_4$ + $.CH_2COCOCH_3$ | | | | | | |
| METHYL FREE RADICAL + 2,3-BUTANEDIONE | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.3 | 3.2 |
| NOTE: $k_{ref}$: $CH_3$ + $CD_3COCOCD_3$ → $CH_3D$ + $.CD_2COCOCD_3$ | | | | | | |
| $k/k_{ref}$: 3.16exp(+300±430/T) | | | | | | |
| ---------- | | | | | | |
| $CD_3$ + $CH_3COCOCH_3$ → $CD_3H$ + $.CH_2COCOCH_3$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + 2,3-BUTANEDIONE | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.8 | 1.3 |
| NOTE: $k_{ref}$: $CD_3$ + $CD_2HCOCOCD_3$ → $CD_3H$ + $.CD_2COCOCD_3$ | | | | | | |
| $k/k_{ref}$: 1.58exp(+900±400/T) | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CD_3 + CD_3COCOCD_3 \rightarrow CD_4 + .CD_2COCOCD_3$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 660-685 | - | - | - | 0.8 | 1.3 |
| NOTE: $k_{ref}$: $CD_3 + CD_2HCOCOCD_3 \rightarrow CD_3H + .CD_2COCOCD_3$ | | | | | | |
| $k/k_{ref}$: 4.0exp(-300±100/T) | | | | | | |
| NOTE: $k_{ref}$: $CD_3 + CD_3COCOCD_3 \rightarrow CD_3C(O). + CD_3COCD_3$ | 660-685 | - | - | - | 0.6 | 1.6 |
| $k/k_{ref}$: 10.0exp(-1360±300/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3COCOCH_3 \rightarrow CH_3C(O). + (CH_3)_2CO$ | | | | | | |
| METHYL FREE RADICAL + 2,3-BUTANEDIONE | | | | | | |
| 73 KNO/SCH REACTION ORDER: 2 | 240-277 | 2.5(+10) | 0 | 3220 | | |
| NOTE: EVALUATION | | | | | | |
| 75 SCH/PLA | 822-905 | 1.6(+11) | 0 | 4330 | | |
| ---------- | | | | | | |
| $CH_3 + CD_3COCOCD_3 \rightarrow CD_3C(O). + CH_3COCD_3$ | | | | | | |
| METHYL FREE RADICAL + 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.4 | 2.5 |
| NOTE: $k_{ref}$: $CD_3 + CD_3COCOCD_3 \rightarrow CD_3C(O). + CD_3COCD_3$ | | | | | | |
| $k/k_{ref}$: 0.5exp(-600±400/T) | | | | | | |
| ---------- | | | | | | |
| $CD_3 + CD_2HCOCOCD_3 \rightarrow CD_2HC(O). + (CD_3)_2CO$ | | | | | | |
| METHYL-$d_3$ FREE RADICAL + 2,3-BUTANEDIONE-1,1,1,4,4-$d_5$ | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 660-685 | - | - | - | 0.6 | 1.6 |
| NOTE: $k_{ref}$: $CD_3 + CD_3COCOCD_3 \rightarrow CD_3C(O). + CD_3COCD_3$ | | | | | | |
| $k/k_{ref}$: 0.2exp(+900±150/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3. + CD_3COCD_2CH_3 \rightarrow CH_3D + .CD_2COCD_2CH_3 + CD_3COCD(.)CH_3$ | | | | | | |
| METHYL FREE RADICAL + 2-BUTANONE-1,1,1,33-$d_5$ | | | | | | |
| 74 SCH/DRE REACTION ORDER: 2 | 523-563 | 1.3(+11) | 0 | 4505±275 | 0.6 | 1.6 |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH_2CH(.)CH_2CH_3$ | | | | | | |
| $+ CH_3CH_2CH_2CH(CH_3)CH_2.$ | | | | | | |
| METHYL FREE RADICAL + 1-PENTENE | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 1.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CH_2CH_2CH{=}CH_2 \rightarrow CH_4 + CH_3CH_2CH(.)CH{=}CH_2$ | | | | | | |
| $+ .CH_2CH_2CH_2CH{=}CH_2 + CH_3CH(.)CH_2CH{=}CH_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2CH{=}CHCH_3 \rightarrow CH_3CH_2CH(.)CH(CH_3)_2$ | | | | | | |
| $+ CH_3CH_2CH(CH_3)CH(.)CH_3$ | | | | | | |
| METHYL FREE RADICAL + 2-PENTENE | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 0.2 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CH_2CH{=}CHCH_3 \rightarrow CH_4 + CH_3CH_2CH{=}CHCH_2.$ | | | | | | |
| $+ CH_3CH(.)CH{=}CHCH_3 + .CH_2CH_2CH{=}CHCH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3. + CH_3CH_2CH_2CH_2CH_2. \rightarrow CH_4 + CH_3CH_2CH_2CH{=}CH_2$ | | | | | | |
| METHYL FREE RADICAL + PENTYL FREE RADICAL | | | | | | |
| 71 WAT REACTION ORDER: 2 $k/k_{ref}$: ≥0.33 | 298 | - | - | - | | |
| NOTE: LOWER LIMIT ESTIMATE. | | | | | | |
| $k_{ref}$: $CH_3 + CH_3CH_2CH_2CH_2CH_2. \rightarrow CH_3(CH_2)_4CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + (CH_3)_4C \rightarrow CH_4 + (CH_3)_3CCH_2.$ | | | | | | |
| METHYL FREE RADICAL + PROPANE, 2,2-DIMETHYL- | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 $k/k_{ref}$: 6.7 | 576-706 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3 + CD_2{=}C{=}O \rightarrow CH_3D + .CD{=}C{=}O$ | | | | | | |
| 73 PAC | 793-953 | 3.2(+13) | 0 | 8060±240 | 0.8 | 1.3 |
| 76 ERA/WEST | 1030-1300 | 6.6(+14) | 0 | 10825 | 0.6 | 1.7 |
| ---------- | | | | | | |
| $CH_3 + CH_3COCOCH_2CH_3 \rightarrow CH_4 + CH_3COCOCH(.)CH_3$ | | | | | | |
| METHYL FREE RADICAL + 2,3-PENTANEDIONE | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 4.5 | 362-398 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3COCOCH_2CH_3 \rightarrow CH_4 + .CH_2COCOCH_2CH_3$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3 + CH_3COCOCH_2CH_3 \rightarrow CH_4 + CH_3COCOCH_2CH_2.$ | | | | | | |
| METHYL FREE RADICAL + 2,3-PENTANEDIONE | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 0.3 | 362-398 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3. + CH_3COCOCH_2CH_3 \rightarrow CH_4 + .CH_2COCOCH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3COCOCH_2CH_3 \rightarrow CH_4 + .CH_2COCOCH_2CH_3$ | | | | | | |
| $+ CH_3COCOCH(.)CH_3 + CH_3COCOCH_2CH_2.$ | | | | | | |
| METHYL FREE RADICAL + 2,3-PENTANEDIONE | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 | 362-398 | - | - | - | 0.4 | 2.5 |
| NOTE: $k_{ref}$: $CH_3 + CH_3COCOCH_2CH_3 \rightarrow CH_3COCH_3 + CH_3CH_2C(O)$ | | | | | | |
| $k/k_{ref}$: 25.12exp(-150*1200/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CD_2COCD_2CH_3 \rightarrow CH_4 + .CH_2CD_2COCD_2CH_3$ | | | | | | |
| METHYL FREE RADICAL + 3-PENTANONE-2,2,4,4-$d_4$ | | | | | | |
| 72 SCH/WOL REACTION ORDER: 2 | 513-572 | 2.0(+11) | 0 | 5540*450 | 0.3 | 3.2 |
| ---------- | | | | | | |
| $CH_3 + CH_3CD_2COCD_2CH_3 \rightarrow CH_3D + CH_3CD(.)COCD_2CH_3$ | | | | | | |
| METHYL FREE RADICAL + 3-PROPANONE-2,2,4,4-$d_4$ | | | | | | |
| 72 SCH/WOL REACTION ORDER: 2 | 513-572 | 1.3(+11) | 0 | 4180*200 | 0.6 | 1.8 |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2CH_2C(CH_3)=CH_2 \rightarrow CH_3CH_2CH_2C(.)(CH_3)CH_2CH_3$ | | | | | | |
| METHYL FREE RADICAL + 1-PENTENE, 2-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 5.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CH_2CH_2C(CH_3)=CH_2 \rightarrow$ | | | | | | |
| $CH_4 + CH_3CH_2CH_2C(CH_3)_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2CH_2C(CH_3)=CH_2 \rightarrow CH_3CH_2CH_2C(.)(CH_3)CH_2CH_3$ | | | | | | |
| $+ CH_3CH_2CH_2C(CH_3)_2CH_2.$ | | | | | | |
| METHYL FREE RADICAL + 1-PENTENE, 2-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 0.6 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CH_2CH_2C(CH_3)=CH_2 \rightarrow CH_4$ | | | | | | |
| $+ CH_3CH_2CH(.)C(CH_3)=CH_2 + .CH_2CH_2CH_2C(CH_3)=CH_2$ | | | | | | |
| $+ CH_3CH_2CH_2C(CH_2.)=CH_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2CH=C(CH_3)_2 \rightarrow CH_3CH_2CH(CH_3)C(.)(CH_3)_2$ | | | | | | |
| METHYL FREE RADICAL + 2-PENTENE, 2-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 1.0 | 923 | - | - | - | | |
| NOTE: $CH_3 + CH_3CH_2CH=C(CH_3)_2 \rightarrow CH_3CH_2CH(.)C(CH_3)_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3CH_2CH=C(CH_3)_2 \rightarrow CH_3CH_2CH(CH_3)C(.)(CH_3)_2$ | | | | | | |
| $+ CH_3CH_2CH(.)C(CH_3)_3$ | | | | | | |
| METHYL FREE RADICAL + 2-PENTENE, 2-METHYL- | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 0.12 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3CH_2CH=C(CH_3)_2 \rightarrow CH_4 + CH_3CH_2CH=C(CH_3)CH_2.$ | | | | | | |
| $+ CH_3CH(.)CH=CH=C(CH_3)_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3 + CH_3(CH_2)_4CH_3 \rightarrow CH_4 + [C_6H_{13}.]$ | | | | | | |
| METHYL FREE RADICAL + HEXANE | | | | | | |
| 76 YAM REACTION ORDER: 2 | 973-1088 | 4.2(+12) | 0 | 5640 | | |
| ---------- | | | | | | |
| $CH_3 + CH_3COCH_2CH_2COCH_3 \rightarrow CH_4 + .CH_2COCH_2CH_2COCH_3$ | | | | | | |
| $+ CH_3COCH(.)CH_2COCH_3$ | | | | | | |
| METHYL FREE RADICAL + 2,5-HEXANEDIONE | | | | | | |
| 75 KNO/SCH REACTION ORDER: 2 | 515-712 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3 + CH_3COCH_2CH_2COCH_3 \rightarrow (CH_3)_2CO$ | | | | | | |
| $+ .CH_2CH_2COCH_3$ | | | | | | |
| $k/k_{ref}$: exp(+1630*10/T) | | | | | | |
| ---------- | | | | | | |
| $CH_4 \rightarrow CH_3 + H$ | | | | | | |
| METHANE | | | | | | |
| 72 NAP/SUE REACTION ORDER: 1 | 1750-2700 | 3.8(+13) | 0 | 47100 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 CHE/BAC REACTION ORDER: 1 | 995-1103 | 2.8(+16) | 0 | 54150 | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| ---------- | | | | | | |
| $CH_4 + O \rightarrow CH_2 + H_2O$ | | | | | | |
| METHANE + OXYGEN ATOM | | | | | | |
| 71 AVR/KOLI REACTION ORDER: 2 | 373-583 | 3.3(+12) | 0 | 3370±350 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $CH_4 + O \rightarrow CH_3 + OH$ | | | | | | |
| METHANE + OXYGEN ATOM | | | | | | |
| 71 AVR/KOLI REACTION ORDER: 2 | 373-583 | 4.2(+13) | 0 | 4630±350 | 0.5 | 1.5 |
| 75 ERA/BRO | 1300-2000 | 1.9(+14) | 0 | 5900 | | |
| 77 RET/JUS | 1500-2250 | 4.1(+14) | 0 | 7030 | | |
| ---------- | | | | | | |
| $CH_4 + O^*(^1D) \rightarrow CH_3 + OH$ | | | | | | |
| METHANE + OXYGEN ATOM | | | | | | |
| 72 GRE REACTION ORDER: 2 $k/k_{ref}$: 2.28 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow$ products: | | | | | | |
| FOR COMPLETELY THERMALIZED $O^*(^1D)$, $k/k_{ref}$: 1.35±0.3 | | | | | | |
| 72 GRE/HEI $k/k_{ref}$: 2.28 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref} = k_2 + k_3$, WHERE $k_2$: $N_2O + O^*(^1D) \rightarrow N_2 + O_2$ | | | | | | |
| AND $k_3$: $N_2O + O^*(^1D) \rightarrow NO + NO$ | | | | | | |
| $k/k_{ref}$: 1.35 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref} = k_2 + k_3$, WHERE $k_2 = N_2O + O^*(^1D) \rightarrow N_2 + O_2$ | | | | | | |
| AND $k_3$: $N_2O + O^*(^1D) \rightarrow NO + NO$ | | | | | | |
| 73 HEI/HUS2 | 300 | 1.9(+14) | - | - | 0.9 | 1.1 |
| 73 HEI/HUS2 REACTION ORDER: 2 $k/k_{ref}$: 1.41 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow$ products | | | | | | |
| 75 GAU/SNE $k/k_{ref}$: 5.1 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow O_2^*(^1\Sigma_g^+) + O$ | | | | | | |
| | 300 | 2.3(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_4 + O^*(^1D) \rightarrow CH_3 + OH + HCHO + H_2$ | | | | | | |
| METHANE + OXYGEN ATOM | | | | | | |
| 76 DAV/SAD REACTION ORDER: 2 | 298 | 7.8(+13) | - | - | 0.8 | 1.2 |
| 77 DAV/SCH | 198-357 | 8.4(+13) | 0 | 0 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_4 + O^*(^1D) \rightarrow HCHO + H_2$ | | | | | | |
| METHANE + OXYGEN ATOM | | | | | | |
| 76 JAY/SIM REACTION ORDER: 2 $k/k_{ref}$: 0.11 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_4 + O^*(^1D) \rightarrow CH_3 + OH$ | | | | | | |
| ---------- | | | | | | |
| $CH_4 + O_3 \rightarrow$ products | | | | | | |
| METHANE + OZONE | | | | | | |
| 73 STE/NIK2 REACTION ORDER: 2 | 298 | 7.2(+2) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CH_4 + H \rightarrow CH_3 + H_2$ | | | | | | |
| METHANE + HYDROGEN ATOM | | | | | | |
| 72 PEE/MAH REACTION ORDER: 2 | 1600 | 3.2(+12) | - | - | 0.8 | 1.2 |
| 73 CIA/DCV1 | 300-1800 | 2.2(+4) | 3.0 | 4400±20 | 0.9 | 1.1 |
| 75 RET/JUS | 1700-2300 | 7.2(+14) | 0 | 7600 | | |
| ---------- | | | | | | |
| $CH_4 + OH \rightarrow CH_3 + H_2O$ | | | | | | |
| METHANE + HYDROXYL FREE RADICAL | | | | | | |
| 72 PEE/MAH REACTION ORDER: 2 | 1100-1900 | 3.0(+13) | 0 | 3020 | | |
| 74 DAV/FIS | | 1.4(+12) | 0 | 1710±90 | 0.9 | 1.1 |
| 74 MAK/KAU | 290-440 | 2.3(+12) | 0 | 1840±20 | 0.9 | 1.1 |
| 75 CVE/PAR | 295 | 3.9(+9) | - | - | 0.9 | 1.1 |
| 75 STE/ZEL | 300-700 | 2.8(+12) | 0 | 1860 | | |
| 76 ZEL/STE | 300-900 | 3.5(+3) | 3.08 | 1010 | 0.8 | 1.2 |
| [illegible] HOW/EVE1 | 296 | 5.7(+9) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 COX/DER1 $k/k_{ref}$: 1.04 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $H_2 + OH \rightarrow H + H_2O$ | | | | | | |
| 76 COX/DER | 298 | 4.6(+9) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $CH_4 + OH(v=n) \rightarrow CH_3 + H_2O$ | | | | | | |
| METHANE + HYDROXYL FREE RADICAL | | | | | | |
| 77 SPE/END REACTION ORDER: 2 | 295 | 1.8(+10) | - | - | | |
| NOTE: UPPER LIMIT k. | | | | | | |
| 72 WER/COL | 298 | 8.4(+9) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $CH_4 + OH + M \rightarrow CH_3 + H_2O + M$ | | | | | | |
| METHANE + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 381 | 1.6(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR M: $H_2O$ | 416 | 3.3(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $CDH_3 + OH + M \rightarrow CH_3 + CDH_2 + DHO + H_2O + M$ | | | | | | |
| METHANE-d + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 2.2(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $CD_2H_2 + OH + M \rightarrow CD_2H. + CDH_2 + H_2O + DHO + M$ | | | | | | |
| METHANE-$d_2$ + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 1.8(+10) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $CD_3H + OH + M \rightarrow CD_2H + CD_3 + DHO + H_2O + M$ | | | | | | |
| METHANE-$d_3$ + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 6.7(+9) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $CD_4 + OH + M \rightarrow CD_3. + DHO + M$ | | | | | | |
| METHANE-$d_4$ + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 416 | 3.0(+9) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $CH_4 + S^*(^1D) \rightarrow CH_3SH$ | | | | | | |
| METHANE + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.076 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $CH_4 + CH \rightarrow$ products | | | | | | |
| METHANE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 2.0(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_4 + CN \rightarrow CH_3 + HCN$ | | | | | | |
| METHANE + CYANOGEN FREE RADICAL | | | | | | |
| 72 BUL/COO2 REACTION ORDER: 2 | 300-377 | 1.3(+13) | 0 | 1005±100 | | |
| 74 SCH/SCH | 298-388 | 3.2(+13) | 0 | 1460 | | |
| 77 SCH/WAG | 259-396 | 6.0(12) | 0 | 870±300 | 0.5 | 1.5 |
| --- | | | | | | |
| $CD_4 + CN \rightarrow CD_3 + DCN$ | | | | | | |
| METHANE-$d_4$ + CYANOGEN FREE RADICAL | | | | | | |
| 72 BUL/COO2 REACTION ORDER: 2 | 300 | 2.4(+11) | - | - | 0.8 | 1.2 |
| NOTE: CN(0,0) BAND | 300 | 3.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: CN(4,4) BAND | | | | | | |
| --- | | | | | | |
| $CH_4 + CN(v=1) \rightarrow CH_3. + HCN$ | | | | | | |
| METHANE + CYANOGEN FREE RADICAL | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 298 | 7.0(+11) | - | - | | |
| --- | | | | | | |
| $CH_4 + CH{=}C. \rightarrow CH_3 + CH{=}CH$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R, (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| METHANE + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.016 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: CH≡CBr + CH≡C. → Br + CH≡CC≡CH | | | | | | |
| --- | | | | | | |
| $CH_4 + CH_3SCH_2. \rightarrow CH_3. + (CH_3)_2S$ | | | | | | |
| METHANE + METHYL, (METHYLTHIO)-, FREE RADICAL | | | | | | |
| 76 ART/LEE REACTION ORDER: 2 | 393-518 | 6.3(+11) | 0 | 7662 | | |
| NOTE: EVALUATION BASED ON $k^{-1}$ AND THERMODYNAMIC DATA | | | | | | |
| --- | | | | | | |
| $CH_4 + M \rightarrow CH_3 + H + M$ | | | | | | |
| METHANE | | | | | | |
| 71 HAR/TRO REACTION ORDER: 1 M: Ar | 1850-2500 | 1.3(+15) | 0 | 52300±1000 | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| REACTION ORDER: 2 M: Ar | 1850-2500 | 2.0(+17) | 0 | 44300±1000 | | |
| NOTE: LOW PRESSURE k | | | | | | |
| 75 BEW REACTION ORDER: 2 M: Ar | 1900-2400 | 1.4(+17) | 0 | 44500 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |
| METHANE | | | | | | |
| 73 VCM2 REACTION ORDER: 2 | 2000-2700 | 4.0(+9) | 0 | 31710±2500 | 0.3 | 3.2 |
| NOTE: LOW PRESSURE k | | | | | | |
| METHANE | | | | | | |
| 75 GAR/OWE | 2000-2700 | 2.3(+14) | 0 | 32500 | | |
| NOTE: $H_2$, Ne, Ar, Kr | | | | | | |
| 75 RET/JLS M: Ar | 1700-2300 | 4.7(+17) | 0 | 46900 | | |
| 77 BEF/PAR M: Ar | 2023-2721 | 2.2(+17) | 0 | 45350 | | |
| --- | | | | | | |
| .CHO + O → CO + OH | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN ATOM | | | | | | |
| 73 MAC/THR REACTION ORDER: 2 $k/k_{ref}$: 0.54 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $k_1$(.CHO + O → CO + OH) + $k_2$(.CHO + O → $CO_2$ + H) | | | | | | |
| --- | | | | | | |
| .CHO + O → CO + OH‡(v=9) | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN ATOM | | | | | | |
| 76 KRI REACTION ORDER: 2 | 298 | 3.6(+12) | - | - | | |
| --- | | | | | | |
| .CHO + O → CO + OH + $CO_2$ + H | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN ATOM | | | | | | |
| 74 WAS/MAR REACTION ORDER: 2 | 297 | 1.3(+14) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| .CHO + O → $CO_2$ + H | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN ATOM | | | | | | |
| 72 WES/$DEH_3$ REACTION ORDER: 2 $k/k_{ref}$: 0.73 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: .CHO + O → CO + OH | | | | | | |
| 73 MAC/THR $k/k_{ref}$: 0.46 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $k_1$(.CHO + O → CO + OH) + $k_2$(.CHO + O → $CO_2$ + H) | | | | | | |
| --- | | | | | | |
| .CHO + $O_2$ → CO + $HO_2$. | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 72 FEE/MAH REACTION ORDER: 2 | 1600 | 3.0(+13) | - | - | | |
| NOTE: TENTATIVE k | | | | | | |
| 74 WAS/MAR | 297 | 3.4(+12) | - | - | 0.8 | 1.2 |
| 77 EHI/EBA | 298 | 5.1(+12) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| .CHO + $O_2$ → $CO_2$ + OH | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 76 OSI/HEI REACTION ORDER: 2 $k/k_{ref}$: ≤0.19 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: .CHO + $O_2$ → CO + $HO_2$. UPPER LIMIT RATIO | | | | | | |
| 77 OSI $k/k_{ref}$: ≤0.19 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: .CHO + $O_2$ → CO + $HO_2$. UPPER LIMIT RATIO | | | | | | |
| --- | | | | | | |
| .CHO + $O_2$ → $HCO_3$ | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 76 OSI/HEI REACTION ORDER: 2 $k/k_{ref}$: 5.0 | - | - | - | 0.8 | 1.2 | |
| NOTE: $k_{ref}$: .CHO + $O_2$ → CO + $HO_2$ | | | | | | |
| --- | | | | | | |
| .CHO + [illegible](+M) → $HCO_3$(+M) | | | | | | |
| METHYL, OXO-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| 77 CSI REACTION ORDER: 2 $k/k_{ref}$: 5.0 | - | - | - | 0.8 | 1.2 | |
| NOTE: $k_{ref}$: $.CHO + O_2 \rightarrow CO + HO_2.$ | | | | | | |
| ---------- | | | | | | |
| $.CHO + H \rightarrow CO + H_2$ | | | | | | |
| METHYL, OXO-, FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 73 MAC/THR REACTION ORDER: 2 $k/k_{ref}$: 4.0 | - | - | - | | | |
| NOTE: $k_{ref}$: $k_1(^1CHO. + O \rightarrow CO + OH) + k_2(.CHO + O \rightarrow CO_2 + H)$ | | | | | | |
| ---------- | | | | | | |
| $.CHO + M \rightarrow CO + H + M$ | | | | | | |
| METHYL, OXO-, FREE RADICAL | | | | | | |
| 76 TSU REACTION ORDER: 2 M: Ar | 1500-2000 | 1.0(+14) | 0 | 11100 | | |
| ---------- | | | | | | |
| $.CHO + NO \rightarrow CO + HNO$ | | | | | | |
| METHYL, OXO-, FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 77 SHI/EBA REACTION ORDER: 2 | 298 | 3.4(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $HCHO + O \rightarrow .CHO + OH$ | | | | | | |
| FORMALDEHYDE + OXYGEN ATOM | | | | | | |
| 73 MAC/THR REACTION ORDER: 2 | 300 | 9.0(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $HCHO + O \rightarrow$ products | | | | | | |
| FORMALDEHYDE + OXYGEN ATOM | | | | | | |
| 74 CAD/WIC REACTION ORDER: 2 | | 3.7(+12) | 0 | 1200 | | |
| NOTE: UNSPECIFIED T RANGE NEAR 300 K. | | | | | | |
| ---------- | | | | | | |
| $HCHO + O_2 \rightarrow .CHO + HO_2$ | | | | | | |
| FORMALDEHYDE + OXYGEN MOLECULE | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713 | 1.3(+1) | - | - | | |
| 74 EAL/FUL | 713-816 | 2.0(+13) | 0 | 19580±750 | | |
| ---------- | | | | | | |
| $HCHO + O_3 \rightarrow OH + HCHO_3 + HO_2. + HCO_2$ | | | | | | |
| FORMALDEHYDE + OZONE | | | | | | |
| 76 BRA/HEI REACTION ORDER: 2 | 298 | 1.3 | - | - | | |
| ---------- | | | | | | |
| $HCHO + H \rightarrow .CHO + H_2$ | | | | | | |
| FORMALDEHYDE + HYDROGEN ATOM | | | | | | |
| 72 RID/DAV REACTION ORDER: 2 | 297 | 3.3(+10) | - | - | 0.9 | 1.1 |
| 72 WES/DEH2 | 297-652 | 1.4(+13) | 0 | 1900 | | |
| 71 MOR/NIK1 | 298 | 8.4(+12) | - | - | 0.7 | 1.3 |
| 71 MOR/NIK2 $k/k_{ref}$: 0.9 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 72 PEE/MAH | 1400-1800 | 2.3(+13) | 0 | 0 | | |
| NOTE: TENTATIVE k. | | | | | | |
| 77 VAN/VAN | 300-1600 | 3.9(+13) | 0 | 705 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HCHO + HO_2 \rightarrow .CHO + H_2O_2$ | | | | | | |
| FORMALDEHYDE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713 | 1.4(+9) | - | - | | |
| 72 EAL/FUL | 773 | 9.6(+8) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $HCHO + N \rightarrow$ products | | | | | | |
| FORMALDEHYDE + NITROGEN ATOM | | | | | | |
| 71 WHI REACTION ORDER: 2 | 323-643 | 2.6(+12) | 0 | 1810±300 | | |
| ---------- | | | | | | |
| $HCHO + CH_3C(O)OO. \rightarrow .CHO + CH_3C(O)OOH$ | | | | | | |
| FORMALDEHYDE + ETHYLDIOXY, 1-OXO, FREE RADICAL | | | | | | |
| 74 DIX/SKI2 REACTION ORDER: 2 $k/k_{ref}$: 2.4 | 119-188 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CHO + CH_3C(O)OO. \rightarrow CH_2C(O). + CH_3C(O)OOH$ | | | | | | |
| ---------- | | | | | | |
| $HCHO + M \rightarrow CO + H_2 + M$ | | | | | | |
| FORMALDEHYDE | | | | | | |
| 73 PEE/MAH1 REACTION ORDER: 2 | 1100-1900 | 2.1(+16) | 0 | 17600±2500 | | |
| NOTE: M: $O_2$, $H_2O$, $CO_2$ | | | | | | |
| 77 MIY/MOR | 500-2090 | 2.1(+15) | 0 | 17620 | | |
| ---------- | | | | | | |
| $HCHO + M \rightarrow .CHO + H + M$ | | | | | | |
| FORMALDEHYDE | | | | | | |
| 75 BEW REACTION ORDER: 2 M: Ar | 1900-2400 | 1.0(+14) | 0 | 18500 | | |
| NOTE: INDIRECT MEASUREMENT | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3O.^*$ → HCHO + H | | | | | | |
| METHOXY FREE RADICAL | | | | | | |
| 73 WIE/HEI REACTION ORDER: 1 $k/k_{ref}$: 1.94 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O^*. + M \rightarrow CH_3O. + M$ ($M=N_2$) | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + O_2 \rightarrow HCHO + HO_2$ | | | | | | |
| METHOXY FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 73 WIE/VIL REACTION ORDER: 2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO \rightarrow HCHO + HNO + CH_3ONO$ | | | | | | |
| $k/k_{ref}=4.7\times10^{-5}$ | | | | | | |
| 75 AIC/MIL | 373 | 1.2(+9) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| 75 GLA | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3O. + NO \rightarrow CH_3ONO$ | | | | | | |
| $k/k_{ref}=5.2\times10^{-5}$ | | | | | | |
| 75 GLA | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3O. + NO_2 \rightarrow CH_3ONO_2$ | | | | | | |
| $k/k_{ref}<7.4\times10^{-5}$. UPPER LIMIT RATIO | | | | | | |
| 75 WIA/MEA | 298 | 2.6(+9) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| 75 MEN/GOL | 300 | 3.5(+8) | - | - | | |
| 77 LAR/BEN | 396-442 | 3.2(+11) | 0 | 2000±1400 | 0.1 | 32 |
| ---------- | | | | | | |
| $CH_3O. + O_3 \rightarrow$ products | | | | | | |
| METHOXY FREE RADICAL + OZONE | | | | | | |
| 75 SIM/HEI REACTION ORDER: 2 | 298 | 1.2(+9) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + H \rightarrow CH_3 + OH$ | | | | | | |
| METHOXY FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 77 MCC/SLE REACTION ORDER: 2 $k/k_{ref}$: 0.69 | 223-398 | - | - | - | 0 | 2.0 |
| NOTE: $k_{ref}$: $CH_3O. + H \rightarrow HCHO + H_2 + CH_3 + OH$ | | | | | | |
| (MOST PROBABLE RATIO) | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + H \rightarrow HCHO + H_2$ | | | | | | |
| METHOXY FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 77 MCC/SLE REACTION ORDER: 2 $k/k_{ref}$: 0.31 | 223-398 | - | - | - | 0.5 | 2.0 |
| NOTE: $k_{ref}$: $CH_3O. + H \rightarrow HCHO + H_2 + CH_3 + OH$ | | | | | | |
| (MOST PROBABLE RATIO) | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + NO \rightarrow HCHO + HNO$ | | | | | | |
| METHOXY FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 73 WIE/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.145 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO \rightarrow HCHO + HNO + CH_3ONO$ | | | | | | |
| 73 WIE/HEI $k/k_{ref}$: 0.145 | 298-423 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO \rightarrow HCHO + HNO + CH_3ONO^*$ | | | | | | |
| 75 EAT/MCC | 393-473 | 4.0(+12) | 0 | 0±500 | 0.3 | 3.2 |
| 75 GLA $k/k_{ref}$: 0.13 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO \rightarrow HCHO + HNO + CH_3ONO$ | | | | | | |
| 77 EAT/MILS | 440-473 | 2.0(+12) | 0 | 0±500 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + NO \rightarrow HCHO + HNO + CH_3ONO$ | | | | | | |
| METHOXY FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 73 WIE/VIL REACTION ORDER: 2 $k/k_{ref}$: 1.2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO_2 \rightarrow HCHO + HONO + CH_3ONO_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + NO \rightarrow CH_3ONO$ | | | | | | |
| METHOXY FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 74 EAT/MIL REACTION ORDER: 2 | 393-473 | 1.3(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 75 EAT/MCC | 393-473 | 1.3(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 7[illegible] EAT/MILS | 440-473 | 1.3(+13) | 0 | 0±500 | 0.3 | 4.0 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + NO_2 \rightarrow HCHO + HONO$ | | | | | | |
| METHOXY FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 77 EAR/BEN REACTION ORDER: 2 $k/k_{ref}$: 0.30 | 396-442 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_3O. + NO_2$ (+M) $\rightarrow CH_3ONO_2$ (+M) | | | | | | |
| 77 EAT/MIL3 | 440-473 | 5.0(+11) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + NO_2 \rightarrow CH_3ONO_2$ | | | | | | |
| METHOXY FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 73 WIE/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.92 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO_2 \rightarrow HCHO + HONO + CH_3ONO_2$ | | | | | | |
| 77 EAT/MIL3 | 440-473 | 5.0(+12) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + NO_2$(+M) $\rightarrow CH_3ONO_2$(+M) | | | | | | |
| METHOXY FREE RADICAL + NITROGEN OXIDE($NO_2$) | | | | | | |
| 77 EAR/BEN REACTION ORDER: 2 | 396-442 | 6.3(+12) | 0 | 0 | 0.3 | 3.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + CO \rightarrow CH_3 + CO_2$ | | | | | | |
| METHOXY FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 73 LIS/MAS REACTION ORDER: 2 | 396-426 | 1.6(+13) | 0 | 5940±750 | 0.3 | 4.0 |
| ---------- | | | | | | |
| $CH_3O. + CO \rightarrow$ products | | | | | | |
| METHOXY FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 73 WIE/HEI REACTION ORDER: 2 | 298-423 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O. + NO \rightarrow HCHO + HNO + CH_3ONO^*$ | | | | | | |
| $k/k_{ref}$: $\approx 5.10^{-4}$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + CH_3O. \rightarrow HCHO + CH_3OH$ | | | | | | |
| METHOXY FREE RADICAL | | | | | | |
| 73 SFO/HEI REACTION ORDER: 2 $k/k_{ref}$: 8.9 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_3O. + CH_3O. \rightarrow CH_3OOCH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + CH_3O. \rightarrow CH_3OOCH_3$ | | | | | | |
| METHOXY FREE RADICAL | | | | | | |
| 76 EAT/MCC1 REACTION ORDER: 2 | 383-413 | 2.0(+13) | 0 | 0 | 0.3 | 3.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + CH_2{=}CH_2 \rightarrow CH_3OCH_2CH_2.$ | | | | | | |
| METHOXY FREE RADICAL + ETHENE | | | | | | |
| 75 LIS/NAS REACTION ORDER: 2 | 300 | 3.7(+7) | - | - | | |
| ---------- | | | | | | |
| $CH_3O. + CH_3CHO \rightarrow CH_3OH + CH_3C(O).$ | | | | | | |
| METHOXY FREE RADICAL + ACETALDEHYDE | | | | | | |
| 75 WEA/MEA REACTION ORDER: 2 $k/k_{ref}$: 15 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_3O. + O_2 \rightarrow HCHO + HO_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + CH_3OOCH_3 \rightarrow CH_3OH + HCHO + CH_3O.$ | | | | | | |
| METHOXY FREE RADICAL + PEROXIDE, DIMETHYL- | | | | | | |
| 77 EAR/BEN REACTION ORDER: 2 | 391-432 | 5.0(+7) | 0 | 0 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + (CH_3)_3C. \rightarrow (CH_3)_3COCH_3$ | | | | | | |
| METHOXY FREE RADICAL + ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 76 EAT/MCC1 REACTION ORDER: 2 | 383-413 | 5.0(+12) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O. + (CH_3)_2CHCH(CH_3)_2 \rightarrow CH_3OH + (CH_3)_2CHC(.)(CH_3)_2$ | | | | | | |
| METHOXY FREE RADICAL + BUTANE, 2,3-DIMETHYL- | | | | | | |
| 75 AIC/MIL REACTION ORDER: 2 | 373 | 4.0(+8) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2. \rightarrow$ products | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| METHYLDIOXY FREE RADICAL + OZONE<br>75 SIM/HEI REACTION ORDER: 2<br>NOTE: UPPER LIMIT k | 298 | <1.4(+7) | - | - | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + NO → $CH_3O\cdot$ + $NO_2$<br>METHYLDIOXY FREE RADICAL + NITROGEN OXIDE(NO)<br>74 SIM/HEI3 REACTION ORDER: 2 $k/k_{ref}$: 2.2 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O_2\cdot$ + $NO_2$ → products<br>76 COX/DER2<br>NOTE: LOWER LIMIT ESTIMATE | 298 | 7.2(+11) | - | - | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + NO → $CH_3O_2NO$<br>METHYLDIOXY FREE RADICAL + NITROGEN OXIDE(NO)<br>73 SPI/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.6 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_3O_2\cdot$ + NO → HCHO + HONO + $CH_3O_2NO$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $NO_2$ → $CH_3O_2NO_2$<br>METHYLDIOXY FREE RADICAL + NITROGEN OXIDE($NO_2$)<br>73 SPI/VIL REACTION ORDER: 2 $k/k_{ref}$: 0.75 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3O_2\cdot$ + $NO_2$ → HCHO + $HONO_2$ + $CH_3O_2NO_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $NO_2$ → products<br>METHYLDIOXY FREE RADICAL + NITROGEN OXIDE($NO_2$)<br>76 COX/DER2 REACTION ORDER: 2 $k/k_{ref}$: 0.05 | 298 | - | - | - | | |
| NOTE: APPROXIMATE RATIO, $k_{ref}$: $CH_3O_2\cdot$ + NO → $CH_3O\cdot$ + $NO_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3\cdot$ → $CH_3O\cdot$ + $CH_3O\cdot$<br>METHYLDIOXY FREE RADICAL + METHYL FREE RADICAL<br>77 PAR REACTION ORDER: 2 | 298 | 3.6(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → HCHO + $CH_3OH$ + $O_2$<br>METHYLDIOXY FREE RADICAL<br>75 PAR REACTION ORDER: 2 | 298 | 1.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → $CH_3O\cdot$ + $CH_3O\cdot$ + $O_2$<br>METHYLDIOXY FREE RADICAL<br>75 PAR REACTION ORDER: 2 | 298 | 8.7(+10) | - | - | 0.9 | 1.1 |
| NOTE: UNREPORTED T ASSUMED TO BE 298<br>75 WEA/MEA $k/k_{ref}$: 0.43 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → products<br>75 ALC/MIL | 373 | 2.3(+11) | - | - | | |
| NOTE: OPTIMIZATION<br>77 PAR | 298 | 9.6(+10) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → $CH_3OH$ + HCHO + $O_2$<br>METHYLDIOXY FREE RADICAL<br>75 WEA/MEA REACTION ORDER: 2 $k/k_{ref}$: 0.50 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → products<br>75 ALC/MIL | 373 | 2.4(+11) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → $CH_3OOCH_3$ + $O_2$<br>METHYLDIOXY FREE RADICAL<br>75 WEA/MEA REACTION ORDER: 2 $k/k_{ref}$: 0.07 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → products | | | | | | |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → $CH_3OOCH_3$ + $CH_3OH$ + HCHO + $O_2$<br>METHYLDIOXY FREE RADICAL<br>77 PAR REACTION ORDER: 2 | 298 | 1.8(+11) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3O_2\cdot$ + $CH_3O_2\cdot$ → products<br>METHYLDIOXY FREE RADICAL<br>73 PAR/PAU REACTION ORDER: 2 | 298 | 2.0(+11) | - | - | 0.67 | 1.33 |
| 77 HOC/GHO | 295 | 2.3(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| $CH_3O_2\cdot + (CH_3)_2CHO_2\cdot \rightarrow HCHO + (CH_3)_2CHOH + O_2$ | | | | | | |
| METHYLDIOXY FREE RADICAL + ETHYLDIOXY, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 AIC/MIL REACTION ORDER: 2 | 373 | 6.2(+11) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| --- | | | | | | |
| $CH_3O_2\cdot + (CH_3)_3CO_2\cdot \rightarrow HCHO + (CH_3)_3COH + O_2$ | | | | | | |
| METHYLDIOXY FREE RADICAL + ETHYLDIOXY, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 75 PAR REACTION ORDER: 2 | 298 | 3.0(+10) | - | - | 0.5 | 1.5 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 | | | | | | |
| --- | | | | | | |
| $CH_3O_2\cdot + (CH_3)_3CO_2\cdot \rightarrow CH_3O\cdot + (CH_3)_3CO\cdot + O_2$ | | | | | | |
| METHYLDIOXY FREE RADICAL + ETHYLDIOXY,1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 75 PAR REACTION ORDER: 2 | 298 | 3.0(+10) | - | - | 0.5 | 1.5 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $CH_3O_2\cdot + (CH_3)_2CHCH(CH_3)_2 \rightarrow CH_3OOH + (CH_3)_2CHC(.)(CH_3)_2$ | | | | | | |
| METHYLDIOXY FREE RADICAL + BUTANE, 2,3-DIMETHYL- | | | | | | |
| 75 AIC/MIL REACTION ORDER: 2 | 373 | 1.6(+5) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| --- | | | | | | |
| $CH_3OH + O \rightarrow HCHO + H_2O$ | | | | | | |
| METHANOL + OXYGEN ATOM | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 3.0(+11) | 0 | 1410±350 | 0.5 | 1.5 |
| --- | | | | | | |
| $CH_3OH + O \rightarrow .CH_2OH + OH$ | | | | | | |
| METHANOL + OXYGEN ATOM | | | | | | |
| 71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 6.0(+12) | 0 | 3320±350 | 0.5 | 1.5 |
| 72 LEE/MEA | 273-438 | 1.7(+12) | 0 | 1150±100 | 0.6 | 1.4 |
| --- | | | | | | |
| $CH_3OH + O^*(^1D) \rightarrow$ products | | | | | | |
| METHANOL + OXYGEN ATOM | | | | | | |
| 75 OSI/SIM $k/k_{ref}$: 5.5 | 298-345 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow NO + NO + N_2 + O_2$ | | | | | | |
| 77 OSI REACTION ORDER: 2 $k/k_{ref}$: 5.5 | 298-345 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $CH_3OH + H \rightarrow .CH_2OH + H_2$ | | | | | | |
| METHANOL + HYDROGEN ATOM | | | | | | |
| 74 MEA/KIM REACTION ORDER: 2 | 298-575 | 6.5(+12) | 0 | 2740±75 | | |
| NOTE: FLOW DISCHARGE METHOD WITH ESR DETECTION | | | | | | |
| k GIVEN WITH CAUTION | | | | | | |
| --- | | | | | | |
| $CH_3OH + D \rightarrow .CH_2OH + DH$ | | | | | | |
| METHANOL + DEUTERIUM ATOM | | | | | | |
| 74 MEA/KIM REACTION ORDER: 2 | 298-575 | 2.8(+13) | 0 | 2620±50 | 0.9 | 1.1 |
| NOTE: FLOW DISCHARGE METHOD WITH ESR DETECTION | | | | | | |
| k GIVEN WITH CAUTION | | | | | | |
| --- | | | | | | |
| $CH_3OH + H \rightarrow$ products | | | | | | |
| METHANOL + HYDROGEN ATOM | | | | | | |
| 71 ADE/WAG REACTION ORDER: 2 | 295-653 | 2.3(+13) | 0 | 2670±150 | 0.9 | 1.1 |
| 73 ADE REACTION ORDER: 2 | 298-650 | 1.3(+13) | 0 | 2670 | | |
| --- | | | | | | |
| $CH_3OH + OH \rightarrow CH_3O\cdot + .CH_2OH + H_2O$ | | | | | | |
| METHANOL + HYDROXYL FREE RADICAL | | | | | | |
| 75 OSI/SIM REACTION ORDER: 2 $k/k_{ref}$: 0.63 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| $k/k_{ref}$: 0.98 | 345 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| --- | | | | | | |
| $CH_3OH + OH \rightarrow .CH_2OH + H_2O$ | | | | | | |
| METHANOL + HYDROXYL FREE RADICAL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 5.7(+13) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_3OH + OH \rightarrow$ products | | | | | | |
| METHANOL + HYDROXYL FREE RADICAL | | | | | | |
| 77 OSI REACTION ORDER: 2 $k/k_{ref}$: 0.63 | 298 | - | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: $k_{ref}$: CO + OH → products | | | | | | |
| $k/k_{ref}$: 0.98 | 345 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: CO + OH → products | | | | | | |
| --- | | | | | | |
| $CH_3OOH$ + H → products | | | | | | |
| HYDROPEROXIDE, METHYL-, + HYDROGEN ATOM | | | | | | |
| 75 SIE/WAR2 REACTION ORDER: 2 | 250-358 | 1.7(+11) | 0 | 956±100 | 0.7 | 1.3 |
| 77 SIE/WAR | 250-358 | 1.7(+11) | 0 | 935±95 | 0.7 | 1.3 |
| --- | | | | | | |
| CS + O → S + CO | | | | | | |
| CARBON MONOSULFIDE FREE RADICAL + OXYGEN ATOM | | | | | | |
| 71 HAN/SMI REACTION ORDER: 2 | 298 | 8.4(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| CS + O → S + CO(v=n) | | | | | | |
| CARBON MONOSULFIDE FREE RADICAL + OXYGEN ATOM | | | | | | |
| 72 HAN/RID REACTION ORDER: 2 $k/k_{ref}$: 0.1 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: CS + O → S + CO(v=13). | | | | | | |
| RATIO INCREASING FROM 0.1 TO 0.9 BETWEEN | | | | | | |
| v=7 AND v=12, THEN DECREASING TO 0.3 FROM | | | | | | |
| v=14 TO v=15. UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| 75 SIA/GRA1 | 305 | 1.2(+13) | - | - | 0.9 | 1.1 |
| 76 BID/BRE | 300 | 1.4(+13) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $CS_2$ + O → CS + SO | | | | | | |
| CARBON DISULFIDE + OXYGEN ATOM | | | | | | |
| 71 TAR REACTION ORDER: 2 | 298 | 1.4(+12) | - | - | 0.9 | 1.1 |
| 75 WEI/TIM | 218-293 | 1.7(+13) | 0 | 645±36 | 0.9 | 1.1 |
| --- | | | | | | |
| $CS_2$ + O → COS + S | | | | | | |
| CARBON DISULFIDE + OXYGEN ATOM | | | | | | |
| 74 SIA/GIL REACTION ORDER: 2 $k/k_{ref}$: 0.093 | 302 | - | - | - | | |
| NOTE: $k_{ref}$: $CS_2$ + O → products | | | | | | |
| 77 GRA/GUT REACTION ORDER: 2 $k/k_{ref}$: 0.098 | 249-500 | - | - | - | | |
| NOTE: $k_{ref}$: $CS_2$ + O → products. | | | | | | |
| WITHIN THE GIVEN T RANGE, THE $k/k_{ref}$ RATIO | | | | | | |
| DECREASES FROM 0.098±0.004 TO 0.081±0.007 | | | | | | |
| 77 GRA/GUT | 249-500 | 1.7(+11) | - | - | 0.9 | 1.2 |
| NOTE: WITHIN THE GIVEN T RANGE, k INCREASES FROM | | | | | | |
| $1.75\times10^{11}$ TO $5.5\times10^{11}$ $cm^3 mol^{-1} s^{-1}$ | | | | | | |
| --- | | | | | | |
| $CS_2$ + O → products | | | | | | |
| CARBON DISULFIDE + OXYGEN ATOM | | | | | | |
| 74 SIA/GIL REACTION ORDER: 2 | 302 | 2.4(+12) | - | - | | |
| --- | | | | | | |
| $CS_2$ + O → products | | | | | | |
| CARBON DISULFIDE + OXYGEN ATOM | | | | | | |
| 77 GRA/GUT REACTION ORDER: 2 | 249-500 | 1.7(+12) | - | - | 0.9 | 1.1 |
| NOTE: NON LINEAR ARRHENIUS BEHAVIOR. | | | | | | |
| WITHIN THE GIVEN T RANGE, k INCREASES FROM $1.7\times10^{12}$ | | | | | | |
| TO $6.7\times10^{12}$ $cm^3 mol^{-1} s^{-1}$ | | | | | | |
| --- | | | | | | |
| $CS_2$ + M → products | | | | | | |
| CARBON DISULFIDE | | | | | | |
| 74 TRA REACTION ORDER: 2 | | 6.8(+14) | 0 | 36000±700 | | |
| NOTE: k MEASURED IN SHOCK TUBE. UNSPECIFIED HIGH T RANGE | | | | | | |
| --- | | | | | | |
| COS + O → SO + CO | | | | | | |
| CARBON OXIDE SULFIDE + OXYGEN ATOM | | | | | | |
| 71 KBE REACTION ORDER: 2 | 300-523 | 9.8(+12) | 0 | 2265 | | |
| 71 KBE/SIM | 300-523 | 9.8(+12) | 0 | 2265 | | |
| 74 KLE/STI | 263-502 | 9.9(+12) | 0 | 2167±28 | 0.9 | 1.1 |
| 75 WEI/TIM | 239-404 | 1.2(+13) | 0 | 2150±35 | 0.8 | 1.2 |
| --- | | | | | | |
| COS + $O^*(^1D)$ → SO + CO | | | | | | |
| CARBON OXIDE SULFIDE + OXYGEN ATOM | | | | | | |
| 75 GAU/SNE REACTION ORDER: 2 $k/k_{ref}$: 4.1 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O_2$ + $O^*(^1D)$ → $O_2^*(^1\Sigma_g^+)$ + O | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 GAU/SNE | 300 | 1.8(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| COS + H → CO + SH | | | | | | |
| CARBON OXIDE SULFIDE + HYDROGEN ATOM | | | | | | |
| 72 KOM/SCH REACTION ORDER: 2 | 298 | 1.3(+10) | - | - | 0.8 | 1.3 |
| 75 TSU/YOK | 300-525 | 9.1(+12) | 0 | 1965±185 | 0.9 | 1.1 |
| 76 LEE | 298-478 | 9.8(+13) | 0 | 2775±40 | 0.9 | 1.1 |
| 77 LEE/STI | 261-500 | 5.5(+12) | 0 | 1940±55 | 0.8 | 1.2 |
| ---------- | | | | | | |
| COS + OH(v=0) → products | | | | | | |
| CARBON OXIDE SULFIDE + HYDROXYL FREE RADICAL | | | | | | |
| 72 WER/COL REACTION ORDER: 2 | 298 | 1.5(+10) | - | - | 0.4 | 1.6 |
| NOTE: UNREPORTED T ASSUMED TO BE 298K | | | | | | |
| ---------- | | | | | | |
| COS + S → CO + $S_2$ | | | | | | |
| CARBON OXIDE SULFIDE + SULFUR ATOM | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 298 | 1.1(+10) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 74 KLE/DAV | 233-245 | 9.2(+11) | 0 | 1825±60 | 0.9 | 1.1 |
| ---------- | | | | | | |
| COS + $S^*(^1D)$ → CO + $S_2$ | | | | | | |
| CARBON OXIDE SULFIDE + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 1.5 | 300 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2$ + $S^*(^1D)$ → products | | | | | | |
| ---------- | | | | | | |
| COS + $CD_3$ → CO + $CD_3S$. | | | | | | |
| CARBON OXIDE SULFIDE + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 354-490 | 3.8(+11) | 0 | 5710±175 | 0.6 | 1.8 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| COS + M → products | | | | | | |
| CARBON OXIDE SULFIDE | | | | | | |
| 74 TRA REACTION ORDER: 2 | | 8.3(+14) | 0 | 31700±650 | | |
| NOTE: k MEASURED IN SHOCK TUBE. UNSPECIFIED HIGH T RANGE | | | | | | |
| ---------- | | | | | | |
| $CH_3S$. + cy-$CH_2CH_2S$ → $CH_3S_2$. + $CH_2{=}CH_2$ | | | | | | |
| METHYL, MERCAPTO-, FREE RADICAL + THURANE | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 304-478 | 3.2(+11) | 0 | 4430 | | |
| NOTE: APPROXIMATE k | | | | | | |
| ---------- | | | | | | |
| $CH_3SH$ + O → $CH_3$ + HS(O). + $CH_3S$(O). + H + $CH_3S$. + $CH_3O$. | | | | | | |
| METHANETHIOL + OXYGEN ATOM | | | | | | |
| 76 SLA/GRA REACTION ORDER: 2 | 300 | 1.1(+12) | - | - | | |
| ---------- | | | | | | |
| CN + O → N + CO | | | | | | |
| CYANOGEN FREE RADICAL + OXYGEN ATOM | | | | | | |
| 75 ALB/HOY REACTION ORDER: 2 | 298 | 1.2(+13) | - | - | 0.7 | 1.3 |
| NOTE: TEMPERATURE-INDEPENDENT WITHIN THE T RANGE 275-387K | | | | | | |
| 77 SCH/WOL | 295 | 1.1(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| CN(v=n) + O → N + CO | | | | | | |
| CYANOGEN FREE RADICAL + OXYGEN ATOM | | | | | | |
| 72 SCH/WOL2 REACTION ORDER: 2 | 298 | 8.0(+12) | - | - | | |
| NOTE: UNREPORTED T ASSUMED TO BE 298K. | | | | | | |
| k UNCHANGED BETWEEN v=0 AND v=5, BUT DECREASING | | | | | | |
| TO 6.0X$10^{12}$ $cm^3 mol^{-1} s^{-1}$ FOR v=6 | | | | | | |
| 73 SCH/SCH1 | 298 | 1.3(+13) | - | - | | |
| NOTE: n=0 TO 6 | | | | | | |
| 73 SCH/SCH1 | 298 | 6.3(+13) | - | - | | |
| NOTE: v=7 | | | | | | |
| ---------- | | | | | | |
| CN + $O_2$ → NCO + O | | | | | | |
| CYANOGEN FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 72 BUL/COO1 REACTION ORDER: 2 | 300-377 | 6.7(+12) | - | - | | |
| NOTE: POSSIBLE SMALL NEGATIVE E | | | | | | |
| 74 SCH/SCH | 299-388 | 3.2(+13) | 0 | 500 | | |
| 75 ALB/HOY | 718-1111 | 3.2(+13) | 0 | 510±170 | 0.7 | 1.3 |
| ---------- | | | | | | |
| CN(v=n) + $O_2$ → NCO + O | | | | | | |
| CYANOGEN FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 72 SCH/WOL2 REACTION ORDER: 2 | 298 | 4.7(+12) | - | - | | |
| NOTE: UNREPORTED T, ASSUMED TO BE 298K. k DECREASING TO | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $1.8\times10^{12}\,cm^3mol^{-1}s^{-1}$ BETWEEN v=0 AND v=6 | | | | | | |
| ---------- | | | | | | |
| $CN(v=0) + O_2 \rightarrow NCO + O$ | | | | | | |
| CYANOGEN FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 73 SCH/SCH1 REACTION ORDER: 2 | 298 | 6.3(+12) | - | - | | |
| NOTE: k DECREASES MONOTONICALLY FROM v=0 TO v=7: | | | | | | |
| $k(v=7) = 1.6\times10^{12}\,cm^3mol^{-1}s^{-1}$ | | | | | | |
| ---------- | | | | | | |
| $CN + H_2 \rightarrow HCN + H$ | | | | | | |
| CYANOGEN FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 74 SCH/SCH REACTION ORDER: 2 | 298-388 | 6.3(+13) | 0 | 2670 | | |
| ---------- | | | | | | |
| $CN + H_2 \rightarrow HCN + H$ | | | | | | |
| CYANOGEN FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 75 ALE/HOY REACTION ORDER: 2 | 718-1111 | 6.0(+13) | 0 | 2670±300 | 0.7 | 1.3 |
| 77 SCH/WAG | 259-396 | 6.0(+13) | 0 | 2670±300 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CN + N \rightarrow C + N_2$ | | | | | | |
| CYANOGEN FREE RADICAL + NITROGEN ATOM | | | | | | |
| 76 SIA REACTION ORDER: 2 | 5000-8000 | 4.4(+14) | 0 | 4530 | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CN + NO \rightarrow N_2 + CO$ | | | | | | |
| CYANOGEN FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 75 NUL/PHI REACTION ORDER: 2 | 1500 | 7.3(+12) | - | - | | |
| ---------- | | | | | | |
| $CN + C \rightarrow N + C_2$ | | | | | | |
| CYANOGEN FREE RADICAL + CARBON ATOM | | | | | | |
| 76 SIA REACTION ORDER: 2 | 5000-8000 | 3.0(+14) | 0 | 18120 | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CN + CO_2 \rightarrow CNO + CO$ | | | | | | |
| CYANOGEN FREE RADICAL + CARBON DIOXIDE | | | | | | |
| 75 BAY/IVE REACTION ORDER: 2 | 1830-2400 | 3.7(+12) | 0 | 0 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CN + CH_4 \rightarrow HCN + CH_3$ | | | | | | |
| CYANOGEN FREE RADICAL + METHANE | | | | | | |
| 72 BUL/COO2 REACTION ORDER: 2 | 300-377 | 1.3(+13) | 0 | 1005±100 | | |
| 74 SCH/SCH | 298-388 | 3.2(+13) | 0 | 1460 | | |
| 77 SCH/WAG | 259-396 | 6.0(12) | 0 | 870±300 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $CN + CD_4 \rightarrow DCN + CD_3$ | | | | | | |
| CYANOGEN FREE RADICAL + METHANE-$d_4$ | | | | | | |
| 72 BUL/COO2 REACTION ORDER: 2 | 300 | 2.4(+11) | - | - | 0.8 | 1.2 |
| NOTE: CN(0,0) BAND | | | | | | |
| NOTE: CN(4,4) BAND | 300 | 3.5(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CN(v=n) + CH_4 \rightarrow HCN + CH_3\cdot$ | | | | | | |
| CYANOGEN FREE RADICAL + METHANE | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 298 | 7.0(+11) | - | - | | |
| NOTE: v=1 | | | | | | |
| ---------- | | | | | | |
| $CN + CH{\equiv}CH \rightarrow$ products | | | | | | |
| CYANOGEN FREE RADICAL + ETHYNE | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 259-396 | 3.0(+13) | 0 | 0 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CN(v=1) + CH{\equiv}CH \rightarrow$ products | | | | | | |
| CYANOGEN FREE RADICAL + ETHYNE | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 298 | 1.5(+14) | - | - | | |
| NOTE: LOWER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CN + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| CYANOGEN FREE RADICAL + ETHENE | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 259-396 | 3.0(+13) | 0 | 0 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CN(v=n) + CH_2{=}CH_2 \rightarrow$ products | | | | | | |
| CYANOGEN FREE RADICAL + ETHENE | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 298 | 6.5(+13) | - | - | | |
| NOTE: v=1 | | | | | | |
| ---------- | | | | | | |
| $CN + CH_3CH_3 \rightarrow HCN + CH_3CH_2\cdot$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| CYANOGEN FREE RADICAL + ETHANE | | | | | | |
| 72 BUL/COO$_2$ REACTION ORDER: 2 | 300-415 | 1.5(+13) | 0 | 0 | | |
| NOTE: ALTERNATIVE EXPRESSION: $k=2.4\times10^{13}\exp(-192/T)\,cm^3mol^{-1}s^{-1}$ | | | | | | |
| 74 SCH/SCH REACTION ORDER: 2 | 298 | 7.9(+12) | - | - | | |
| $CN + NCCN \rightarrow [.C_3N_3]$ | | | | | | |
| CYANOGEN FREE RADICAL + ETHANEDINITRILE | | | | | | |
| 72 BUL/COO1 REACTION ORDER: 2 | 300-377 | 5.6(+11) | 0 | 1576 | | |
| $CN + CH_3CH_2CH_3 \rightarrow HCN + (CH_3)_2CH. + CH_3CH_2CH_2.$ | | | | | | |
| CYANOGEN FREE RADICAL + PROPANE | | | | | | |
| 72 BUL/COO$_2$ REACTION ORDER: 2 | 300 | 3.2(+13) | - | - | 0.8 | 1.2 |
| $CN + M \rightarrow C + N + M$ | | | | | | |
| CYANOGEN FREE RADICAL | | | | | | |
| 76 SLA REACTION ORDER: 2 M: Ar | 4400-1300 | 1.2(+14) | 0 | 71000±5500 | 0.7 | 1.3 |
| $CH_2{=}N{=}N + H \rightarrow N_2 + CH_3$ | | | | | | |
| METHANE, DIAZO-, + HYDROGEN ATOM | | | | | | |
| 72 NIK/MOR2 REACTION ORDER: 2 | 300 | 9.6(+12) | - | - | | |
| $CH_3N{=}N. \rightarrow CH_3 + N_2$ | | | | | | |
| DIAZENYL, METHYL- | | | | | | |
| 76 VID/WIL REACTION ORDER: 1 | 295 | >3.0(+6) | - | - | | |
| $CH_3N{=}NH + CH_3 \rightarrow CH_3N{=}N. + CH_4$ | | | | | | |
| DIAZENE, METHYL-, + METHYL FREE RADICAL | | | | | | |
| 76 VID/WIL REACTION ORDER: 2 | 294 | 1.3(+10) | - | - | 0.9 | 1.1 |
| $CH_3NHNH_2 \rightarrow CH_2{=}NH + NH_3$ | | | | | | |
| HYDRAZINE, METHYL- | | | | | | |
| 72 GOL/SOL REACTION ORDER: 1 | 943-1263 | 1.6(+13) | 0 | 27180 | | |
| $CH_3NHNH_2 \rightarrow CH_3N{=}NH + H_2$ | | | | | | |
| HYDRAZINE, METHYL- | | | | | | |
| 72 GOL/SOL REACTION ORDER: 1 | 943-1263 | 3.2(+13) | 0 | 28690 | | |
| $NCO + O \rightarrow CO + NO$ | | | | | | |
| CYANATO FREE RADICAL + OXYGEN ATOM | | | | | | |
| 74 SCH/SCH REACTION ORDER: 2 | 298 | 8.9(+12) | - | - | | |
| $NH_2C(O). + NH_2C(O). \rightarrow NH_2COCONH_2 + HNCO + HCONH_2$ | | | | | | |
| AMIDOGEN, FORMYL-, FREE RADICAL | | | | | | |
| 73 YOK/BAC REACTION ORDER: 2 | 578 | 3.1(+13) | - | - | 0.7 | 1.3 |
| $NH_2C(O). + M \rightarrow NH_2 + CO + M$ | | | | | | |
| AMIDOGEN, FORMYL-, FREE RADICAL | | | | | | |
| 73 YOK/BAC REACTION ORDER: 1 | 578 | 5.9(+12) | - | - | 0.7 | 1.3 |
| NOTE: LIMITING HIGH-PRESSURE k. $M=HCONH_2$ | | | | | | |
| 73 YOK/BAC | 578 | 1.0(+17) | - | - | | |
| NOTE: $k_0$(LOW PRESSURE). $M=HCONH_2$ | | | | | | |
| $CH_3NO^{\#} \rightarrow CH_3 + NO$ | | | | | | |
| METHANE, NITROSO- | | | | | | |
| 74 TIT/BAL REACTION ORDER: 1 | 443 | 2.0(+7) | - | - | | |
| $HCONH_2 + NH_2 \rightarrow .C(O)NH_2 + NH_3$ | | | | | | |
| FORMAMIDE + AMIDOGEN FREE RADICAL | | | | | | |
| 73 EAC/YOK REACTION ORDER: 2 | 573 | 8.4(+9) | - | - | | |
| $CH_3ONO \rightarrow HCHO + HNO$ | | | | | | |
| NITROUS ACID METHYL ESTER | | | | | | |
| 75 BAT/MCC REACTION ORDER: 1 | 393-473 | 1.0(+10) | 0 | 16000 | | |
| 77 BAT/MIL3 | 440-473 | 4.0(+13) | 0 | 19380±500 | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| $CH_3ONO \rightarrow CH_3O. + NO$ | | | | | | |
| NITROUS ACID METHYL ESTER | | | | | | |
| 74 BAT/MIL REACTION ORDER: 1 | 393-473 | 6.3(+15) | 0 | 20730±500 | 0.4 | 2.5 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 EAT/MCC<br>77 EAT/MIL3 | 393-473<br>440-473 | 6.3(+15)<br>6.3(+15) | 0<br>0 | 20735±500<br>20740±500 | 0.4<br>0.3 | 2.5<br>4.3 |
| $CH_3ONO + O \rightarrow HCHO + OH + NO$<br>NITROUS ACID METHYL ESTER + OXYGEN ATOM<br>75 DAV/THR — REACTION ORDER: 2 | 300-410 | 1.4(+13) | 0 | 2620±240 | | |
| $CH_3ONO + O_3 \rightarrow CH_3ONO_2 + O_2$<br>NITROUS ACID METHYL ESTER + OZONE<br>76 HAS/FRE — REACTION ORDER: 2 | 298-352 | 4.1(+11) | 0 | 5315±172 | 0.6 | 1.7 |
| $CH_3ONO + H \rightarrow CH_3O. + HNO + .CH_2ONO + H_2$<br>NITROUS ACID METHYL ESTER + HYDROGEN ATOM<br>77 MCC/SLE — REACTION ORDER: 2<br>NOTE: k IS (53+5)% OF k(OVERALL) (SEE BELOW) | 223-398 | 1.4(+11) | 0 | 956±55 | 0.8 | 1.2 |
| $CH_3ONO + H \rightarrow CH_3OH + NO$<br>NITROUS ACID METHYL ESTER + HYDROGEN ATOM<br>77 MCO/SLE — REACTION ORDER: 2<br>NOTE: k IS(47+5)% OF k(OVERALL) (SEE BELOW) | 223-398 | 1.2(+11) | 0 | 956±55 | 0.8 | 1.2 |
| $CH_3ONO + H \rightarrow CH_3OH + NO + .CH_2ONO + H_2 + CH_3O. + HNO$<br>NITROUS ACID METHYL ESTER + HYDROGEN ATOM<br>77 MCO/SLE — REACTION ORDER: 2<br>NOTE: OVERALL REACTION | 223-398 | 2.6(+11) | 0 | 956±55 | 0.8 | 1.2 |
| $CH_3ONO + OH \rightarrow$ products<br>NITROUS ACID METHYL ESTER + HYDROXYL FREE RADICAL<br>75 CAM/GOO2 — REACTION ORDER: 2<br>NOTE: EVALUATION | 292 | 8.0(+11) | - | - | 0.9 | 1.1 |
| $CH_3ONO_2 \rightarrow CH_3O. + NO_2$<br>NITRIC ACID METHYL ESTER<br>77 EAT/MIL3 — REACTION ORDER: 1<br>NOTE: EVALUATION | 440-473 | 5.0(+15) | 0 | 20400±500 | 0.3 | 4.3 |
| $CH_3NO_2 + O \rightarrow CH_3O. + NO_2$ (OR $.CH_2NO_2 + OH$)<br>METHANE, NITRO-, + OXYGEN ATOM<br>75 CAM/GOO1 — REACTION ORDER: 2 | 295 | 1.9(+9) | - | - | 0.8 | 1.2 |
| $CH_3NO_2 + H \rightarrow$ products<br>METHANE, NITRO-, + HYDROGEN ATOM<br>75 SLE/WAR2 — REACTION ORDER: 2 | 298-398 | 1.6(+12) | 0 | 1760±125 | 0.6 | 1.4 |
| $CH_3NO_2 + OH \rightarrow$ products<br>METHANE, NITRO-, + HYDROXYL FREE RADICAL<br>75 CAM/GOO2 — REACTION ORDER: 2<br>NOTE: EVALUATION | 292 | 5.5(+11) | - | - | 0.9 | 1.1 |
| $CH_3NO_2 + M \rightarrow CH_3. + NO_2 + M$<br>METHANE, NITRO-<br>72 GLA/TRO — REACTION ORDER: 1 M: Ar<br>NOTE: LIMITING HIGH PRESSURE k | 900-1400 | 1.3(+13) | 0 | 29440±250 | | |
| $CH_3NO_2 + M \rightarrow CH_3. + NO_2 + M$<br>METHANE, NITRO-<br>72 GLA/TRO — REACTION ORDER: 2 M: Ar<br>NOTE: LOW PRESSURE k | 900-1400 | 1.3(+17) | 0 | 21140 | | |
| $CH_3O_2NO + CH_3O_2NO + O_2 \rightarrow CH_3ONO_2 + CH_3ONO_2 + O_2$<br>PEROXYNITROUS ACID METHYL ESTER + MOLECULE<br>73 SPI/VIL — REACTION ORDER: 3 | 298 | 3.8(+13) | - | - | | |
| $C_2 + M \rightarrow C + C + M$<br>CARBON DIMER<br>75 BEC/MAC — REACTION ORDER: 2 M: Ar | 4860-6920 | 3.7(+14) | 0 | 69900±7100 | 0.5 | 1.9 |
| $C_2O + O \rightarrow CO + CO$<br>CARBON OXIDE($C_2O$) + OXYGEN ATOM<br>72 SHA/MAS — REACTION ORDER: 2 | 300 | 5.7(+13) | - | - | 0.6 | 1.6 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| CH≡C. + $O_2$ → CH≡ + $CO_2$<br>ETHYNYL FREE RADICAL + OXYGEN MOLECULE<br>72 MAT/SIA REACTION ORDER: 2 | 1100-2100 | - | - | 12600±5000 | | |
| CH≡C. + $O_2$ → .CHO≡ + CO<br>ETHYNYL FREE RADICAL + OXYGEN MOLECULE<br>72 MAT/SIA REACTION ORDER: 2 | 1100-2100 | - | - | 5500±5000 | | |
| CH≡C. + $H_2$ → CH≡CH + H<br>ETHYNYL FREE RADICAL + HYDROGEN MOLECULE<br>74 YAM/LAV REACTION ORDER: 2<br>NOTE: $k_1 = Kk_{-1}$ | 1063-1233 | 6.0(+12) | 0 | 3270 | 0.4 | 1.25 |
| CH≡C. + $CH_4$ → CH≡CH + $CH_3$.<br>ETHYNYL FREE RADICAL + METHANE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.016<br>NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CC≡CH + Br. | 298 | - | - | - | 0.7 | 1.3 |
| CH≡C. + CH≡CH → CH≡CC≡CH + H.<br>ETHYNYL FREE RADICAL + ETHYNE<br>73 CUL/HUC REACTION ORDER: 2 | 298 | 1.0(+11) | 0 | 1500 | | |
| CH≡C. + CD≡CD → CH≡CC≡CD + D.<br>ETHYNYL FREE RADICAL + ETHYNE-$d_2$<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 2.8<br>NOTE: $k_{ref}$: CH≡C. CD≡CD → CH≡CD + CD≡C. | 298 | - | - | - | 0.1 | 1.9 |
| CH≡C. + CD≡CD → CH≡CC≡CD + D.<br>ETHYNYL FREE RADICAL + ETHYNE-$d_2$<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.67<br>NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CC≡CH + Br | 298 | - | - | - | 0.9 | 1.2 |
| CH≡C. + $CH_3CH_3$ → CH≡CH + $CH_3CH_2$.<br>ETHYNYL FREE RADICAL + ETHANE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.54<br>NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CC≡CH + Br. | 298 | - | - | - | 0.9 | 1.1 |
| CH≡C. + $CH_3C$≡CH → CH≡CH + .$CH_2C$≡CH<br>ETHYNYL FREE RADICAL + 1-PROPYNE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 25.0<br>NOTE: $k_{ref}$: CH≡C. + $CH_3C$≡CH → CH≡CC≡$CCH_3$ + H | 298 | - | - | - | 0.9 | 1.1 |
| CH≡C. + $CH_3C$≡CH → CH≡CC≡CH + $CH_3$.<br>ETHYNYL FREE RADICAL + 1-PROPYNE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 9.9<br>NOTE: $k_{ref}$: CH≡C. + $CH_3C$≡CH → CH≡CC≡$CCH_3$ + H | 298 | - | - | - | 0.9 | 1.1 |
| CH≡C. + $CH_3C$≡CH → CH≡CC≡$CCH_3$ + H.<br>ETHYNYL FREE RADICAL + 1-PROPYNE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.2<br>NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CH + .C≡CBr | 298 | - | - | - | 0.7 | 1.7 |
| CH≡C. + $CH_3C$≡CH → CH≡CC≡$CCH_3$ + H<br>ETHYNYL FREE RADICAL + 1-PROPYNE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.043<br>NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CC≡CH + Br. | 298 | - | - | - | 0.9 | 1.2 |
| CH≡C. + CH≡CC≡CH → CH≡CH + CH≡CC≡C.<br>ETHYNYL FREE RADICAL + 1,3-BUTADIYNE<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 1.1<br>NOTE: $k_{ref}$: CH≡C. + CH≡CC≡CH → CH≡CC≡CC≡CH + H | 298 | - | - | - | 0.8 | 1.2 |
| CH≡C. + CH≡CC≡CH → CH≡CC≡CC≡CH + H<br>ETHYNYL FREE RADICAL + 1,3-BUTADIYNE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 1.67 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CH + .C≡CBr | | | | | | |
| CH≡C. + $(CH_3)_4C$ → CH≡CH + $(CH_3)_3CCH_2$. | | | | | | |
| ETHYNYL FREE RADICAL + PROPANE, 2,2-DIMETHYL- | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.91 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: CH≡C. + CH≡CBr → CH≡CC≡CH + Br. | | | | | | |
| CH≡CH → CH≡C. + H | | | | | | |
| ETHYNE | | | | | | |
| 74 ALT REACTION ORDER: 1 | 1700-2000 | 1.0(+15) | 0 | 55360 | | |
| CH≡CH + O → $CH_2$ + CO | | | | | | |
| ETHYNE + OXYGEN ATOM | | | | | | |
| 73 CAE/GLA REACTION ORDER: 2 | 300 | 1.3(+11) | - | - | | |
| NOTE: UPPER LIMIT k. | | | | | | |
| 73 FEE/MAH2 | 1200-1700 | 5.2(+13) | 0 | 1860 | | |
| 77 VAN/VAN | 700-1430 | 6.7(+13) | 0 | 2000 | | |
| NOTE: EVALUATION | | | | | | |
| CH≡CH + O → products | | | | | | |
| ETHYNE + OXYGEN ATOM | | | | | | |
| 71 STU/NIK2 REACTION ORDER: 2 | 300 | 7.8(+10) | - | - | 0.9 | 1.1 |
| 77 WES/DEH | 297 | 7.2(+10) | - | - | 0.9 | 1.1 |
| CD≡CD + O → products | | | | | | |
| ETHYNE-$d_2$ + OXYGEN ATOM | | | | | | |
| 71 STU/NIK2 REACTION ORDER: 2 | 300 | 7.8(+10) | - | - | 0.9 | 1.1 |
| CH≡CH + O + M → $CH_2$=C=O + M | | | | | | |
| ETHYNE + OXYGEN ATOM | | | | | | |
| 73 CAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 1.7(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE, UPPER LIMIT k | | | | | | |
| CH≡CH + $O_3$ → products | | | | | | |
| ETHYNE + OZONE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 1.8(+4) | - | - | 0.8 | 1.2 |
| 73 STE/NIK2 | 298 | 5.2(+4) | - | - | 0.9 | 1.1 |
| 76 PAT/ATK | 297 | 2.3(+4) | - | - | 0.8 | 1.2 |
| CH≡CH + H → CH≡C. + $H_2$ | | | | | | |
| ETHYNE + HYDROGEN ATOM | | | | | | |
| 74 YAM/LAV REACTION ORDER: 2 | 1063-1233 | 4.8(+13) | 0 | 8260±2000 | 0.4 | 2.5 |
| CH≡CH + D → CH≡CD + H | | | | | | |
| ETHYNE + DEUTERIUM ATOM | | | | | | |
| 71 EGY/WAG REACTION ORDER: 2 | 200-465 | 3.1(+13) | 0 | 1860±100 | | |
| 76 KEI/LYN | 298 | 7.3(+10) | - | - | 0.9 | 1.1 |
| NOTE: AVERAGE k FOR PRESSURE RANGE 1-6.7TORR. | | | | | | |
| CD≡CD + H → CH≡CD + D | | | | | | |
| ETHYNE-$d_2$ + HYDROGEN ATOM | | | | | | |
| 71 EGY/WAG REACTION ORDER: 2 | 300-470 | 2.0(+13) | 0 | 2670±250 | | |
| CH≡CH + H → $CH_2$=CH. | | | | | | |
| ETHYNE + HYDROGEN ATOM | | | | | | |
| 71 GSH REACTION ORDER: 2 | 298 | 2.7(+10) | - | - | | |
| 76 KEI/LYN | 298 | 6.3(+9) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE-DEPENDENT k, INCREASING FROM $6.3\times10^9$ TO $1.3\times10^{10}$ $cm^3 mol^{-1} s^{-1}$ WITHIN THE 1-10 TORR PRESSURE RANGE | | | | | | |
| CD≡CD + D → $CD_2$=CD. | | | | | | |
| ETHYNE-$d_2$ + DEUTERIUM ATOM | | | | | | |
| 76 KEI/LYN REACTION ORDER: 2 | 298 | 6.6(+9) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE DEPENDENT k, INCREASING FROM $6.6\times10^9$ TO $1.1\times10^{10}$ $cm^3 mol^{-1} s^{-1}$ WITHIN THE 1-56 TORR PRESSURE RANGE | | | | | | |
| CH≡CH + H → products | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ETHYNE + HYDROGEN ATOM | | | | | | |
| 76 KEI/LYN REACTION ORDER: 2 | 298 | 2.7(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE DEPENDENT $k_\infty$ INCREASING FROM $2.7\times10^{10}$ TO $1.1\times10^{11}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 6-7.42 TORR PRESSURE RANGE | | | | | | |
| --- | | | | | | |
| CD≡CD + H → products | | | | | | |
| ETHYNE-$d_2$ + HYDROGEN ATOM | | | | | | |
| 76 KEI/LYN REACTION ORDER: 2 | 298 | 4.0(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE DEPENDENT $k_\infty$ INCREASING FROM $4.0\times10^{10}$ TO $5.8\times10^{10}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 1.2-5.6 TORR PRESSURE RANGE (IN EXCESS $C_2D_2$) | | | | | | |
| --- | | | | | | |
| CD≡CD + H → products | | | | | | |
| ETHYNE-$d_2$ + HYDROGEN ATOM | | | | | | |
| 76 KEI/LYN REACTION ORDER: 2 | 298 | 2.2(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE DEPENDENT $k_\infty$ INCREASING FROM $2.2\times10^{10}$ TO $3.5\times10^{10}$ $cm^3mol^{-1}s^{-1}$ WITHIN THE 1-5 TORR PRESSURE RANGE (IN EXCESS H) | | | | | | |
| --- | | | | | | |
| CH≡CH + H + M → $CH_2$=CH. + M | | | | | | |
| ETHYNE + HYDROGEN ATOM | | | | | | |
| 76 PAY/STI REACTION ORDER: 2 M: He | 193-400 | 5.5(+12) | 0 | 1210±70 | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| --- | | | | | | |
| CH≡CH + $D_2$ → CHD=CHD | | | | | | |
| ETHYNE + DEUTERIUM MOLECULE | | | | | | |
| 77 EGU2 REACTION ORDER: 2 | 1000-1600 | 4.9(+11) | 0 | 17565±300 | 0.7 | 1.3 |
| 71 VAN/VAN REACTION ORDER: 2 | 650-1100 | 5.5(+13) | 0 | 6900 | | |
| CH≡CH + OH → $CH_3$ + CO | | | | | | |
| ETHYNE + HYDROXYL FREE RADICAL | | | | | | |
| 77 VAN/VAN REACTION ORDER: 2 | 650-1110 | 5.5(+13) | 0 | 6900 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| CH≡CH + OH → CH≡CO. + $H_2$ | | | | | | |
| ETHYNE + HYDROXYL FREE RADICAL | | | | | | |
| 71 BRE/GLA REACTION ORDER: 2 | 295 | 1.1(+11) | - | - | 0.7 | 1.3 |
| --- | | | | | | |
| CH≡CH + OH → $CH_2$=C=O + H | | | | | | |
| ETHYNE + HYDROXYL FREE RADICAL | | | | | | |
| 77 VAN/VAN REACTION ORDER: 2 | 570-850 | 3.2(+11) | 0 | 100 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| CH≡CH + OH → products | | | | | | |
| ETHYNE + HYDROXYL FREE RADICAL | | | | | | |
| 73 SMI/ZEL1 REACTION ORDER: 2 | 210-460 | 1.2(+12) | 0 | 250 | | |
| 74 FAS/CAR | 298 | 1.2(+11) | - | - | | |
| --- | | | | | | |
| CH≡CH + OH + M → products | | | | | | |
| ETHYNE + HYDROXYL FREE RADICAL | | | | | | |
| 77 FIR/ATK2 REACTION ORDER: 2 M: Ar | 288-422 | 1.2(+12) | 0 | 310±200 | | |
| NOTE: AT PRESSURES ≥200 TORR. | | | | | | |
| --- | | | | | | |
| CH≡CH + OH + M → products | | | | | | |
| ETHYNE + HYDROXYL FREE RADICAL | | | | | | |
| 75 DAV/FIS REACTION ORDER: 2 M: He | 300 | 9.9(+10) | - | - | 0.9 | 1.1 |
| NOTE: PRESSURE INDEPENDENT k | | | | | | |
| --- | | | | | | |
| CH≡CH + S → cy-CH=CHS | | | | | | |
| ETHYNE + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 6.2exp(-1007/T); $k_{ref}$: $CH_2$=$CH_2$ + S → cy-$CH_2CH_2S$ CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| CH≡CH + $SO_2$ → products | | | | | | |
| ETHYNE + SULFUR DIOXIDE | | | | | | |
| 71 FIF/MOR REACTION ORDER: 2 | 1500-2150 | 3.2(+10) | 0.5 | 20535 | | |
| NOTE: GIVEN WITH CAUTION. | | | | | | |
| --- | | | | | | |
| CH≡CH + CH → products | | | | | | |
| ETHYNE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 [illegible]S/PER REACTION ORDER: 2 | 298 | 4.5(+13) | - | - | 0.9 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH{\equiv}CH + {}^3CH_2 \rightarrow CH_3C{\equiv}CH + CH_2{=}C{=}CH_2$ | | | | | | |
| ETHYNE + METHYLENE FREE RADICAL | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 | 298 | 4.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: $3CH_2$ (GROUND STATE). LIMITING HIGH PRESSURE k. | | | | | | |
| 77 FIL/ROB | 298 | 2.4(+12) | - | - | | |
| NOTE: ${}^3CH_2$ (GROUND STATE) | | | | | | |
| ---------- | | | | | | |
| $CH{\equiv}CH + CH_3.$ → $CH_3CH{=}CH$ | | | | | | |
| ETHYNE + METHYL FREE RADICAL | | | | | | |
| 77 HCI/KER REACTION ORDER: 2 | 379-487 | 6.2(+11) | 0 | 3880±750 | 0.2 | 6.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH{\equiv}CH + CN$ → products | | | | | | |
| ETHYNE + CYANOGEN FREE RADICAL | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 259-396 | 3.0(+13) | 0 | 0 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH{\equiv}CH + CN(v{=}1)$ → products | | | | | | |
| ETHYNE + CYANOGEN FREE RADICAL | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 298 | 1.5(+14) | - | - | | |
| NOTE: LOWER LIMIT k. | | | | | | |
| ---------- | | | | | | |
| $CH{\equiv}CH + CH{\equiv}C.$ → $H + CH{\equiv}CC{\equiv}CH$ | | | | | | |
| ETHYNE + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 | 298 | 1.0(+11) | - | 1500 | | |
| ---------- | | | | | | |
| $CD{\equiv}CD + CH{\equiv}C.$ → $D. + CH{\equiv}CC{\equiv}CD$ | | | | | | |
| ETHYNE-$d_2$ + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 2.8 | 298 | - | - | - | 0.1 | 1.9 |
| NOTE: $k_{ref}$: $CD{\equiv}CD + CH{\equiv}C.$ → $CD{\equiv}C. + CH{\equiv}CD$ | | | | | | |
| $k/k_{ref}$: 0.67 | 298 | - | - | - | 0.9 | 1.2 |
| NOTE: $k_{ref}$: $CH{\equiv}CBr + CH{\equiv}C.$ → $Br + CH{\equiv}CC{\equiv}CH$ | | | | | | |
| ---------- | | | | | | |
| $CH{\equiv}CH + CH{\equiv}CH$ → $CH_2{=}CHC{\equiv}CH$ | | | | | | |
| ETHYNE | | | | | | |
| 77 GGU1 REACTION ORDER: 2 | 1000-1670 | 2.5(+14) | 0 | 23350±700 | 0.5 | 1.8 |
| 77 GGU2 | 1000-1600 | 1.5(+14) | 0 | 22250±750 | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH{\equiv}CH + .CH{=}C{=}C$ → products | | | | | | |
| ETHYNE + ETHENYL, 2-OXO-, FREE RADICAL | | | | | | |
| 73 JEN/BAY REACTION ORDER: 2 | 298 | 5.0(+8) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH. + CH_2{=}CH.$ → $CH{\equiv}CH + CH_2{=}CH_2$ | | | | | | |
| ETHENYL FREE RADICAL | | | | | | |
| 73 MAC/CUR REACTION ORDER: 2 | 298 | 3.2(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CH. + M$ → $CH{\equiv}CH + H + M$ | | | | | | |
| ETHENYL FREE RADICAL | | | | | | |
| 73 PEE/MAH2 REACTION ORDER: 2 | 1500 | 2.0(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O$ → $CH_2 + HCHO$ | | | | | | |
| ETHENE + OXYGEN ATOM | | | | | | |
| 73 PEE/MAH2 REACTION ORDER: 2 | 1200-1600 | 2.5(+13) | 0 | 2520 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O$ → $CH_3. + CHO.$ | | | | | | |
| ETHENE + OXYGEN ATOM | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 7.0(+11) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| 73 HUI | 232-500 | 3.3(+12) | 0 | 569±16 | 0.9 | 1.1 |
| 73 KUR/HUI | 298 | 4.8(+11) | - | - | 0.9 | 1.1 |
| 73 PEE/MAH2 | 1200-1700 | 2.3(+13) | 0 | 1360 | | |
| 74 PRU/SLA REACTION ORDER: 2 $k/k_{ref}$: 0.95 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + O$ → products | | | | | | |
| ---------- | | | | | | |
| $CD_2{=}CD_2 + O$ → $CD_3 + CDO$ | | | | | | |
| ETHENE-$D_4$ + OXYGEN ATOM | | | | | | |
| 73 KUR/HUI REACTION ORDER: 2 | 298 | 4.9(+11) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O \rightarrow CH_2{=}C{=}O + H_2$ | | | | | | |
| ETHENE + OXYGEN ATOM | | | | | | |
| 74 FRU/SIA REACTION ORDER: 2 | 300 | 2.3(+10) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O \rightarrow cy\text{-}CH_2CH_2O$ | | | | | | |
| ETHENE + OXYGEN ATOM | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 4.3(+11) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 7.0(+12) | 0 | 845±50 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O \rightarrow$ products | | | | | | |
| ETHENE + OXYGEN ATOM | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 3.0(+11) | - | - | 0.9 | 1.1 |
| 71 STU/NIK2 | 300 | 3.8(+10) | - | - | 0.8 | 1.1 |
| 74 MCC $k/k_{ref}$: 0.042 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $(CH_3)2C{=}CH_2 + O \rightarrow$ products | | | | | | |
| 72 ATK/CVE | 298-473 | 8.1(+12) | 0 | 975±50 | 0.9 | 1.1 |
| 72 IAV/HUI | 232-500 | 3.3(+12) | 0 | 570±16 | 0.9 | 1.1 |
| 72 STU/NIK3 | 298 | 3.8(+11) | - | - | 0.9 | 1.1 |
| 74 SIA/PRU | 300 | 4.6(+12) | - | - | | |
| 74 ATK/PIT1 | 300-392 | 3.4(+12) | 0 | 640±100 | | |
| 74 ATK/PIT2 | 301 | 4.0(+11) | - | - | 0.9 | 1.1 |
| 77 ATK/PIT1 | 298-439 | 5.6(+12) | 0 | 742±100 | | |
| ---------- | | | | | | |
| $CD_2{=}CD_2 + O \rightarrow$ products | | | | | | |
| ETHENE-$d_4$ + OXYGEN ATOM | | | | | | |
| 72 STU/NIK3 REACTION ORDER: 2 | 298 | 3.4(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O + M \rightarrow$ products | | | | | | |
| ETHENE + OXYGEN ATOM | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 7.0(+11) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k. GIVEN WITH CAUTION. | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O_3 \rightarrow [CH_2{=}CH_2.O_3]$ | | | | | | |
| ETHENE + OZONE | | | | | | |
| 76 TOB/TOB REACTION ORDER: 2 | 303 | 1.02(+6) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + O_3 \rightarrow$ products | | | | | | |
| ETHENE + OZONE | | | | | | |
| 73 STE/WU REACTION ORDER: 2 | 299 | 9.3(+5) | - | - | 0.9 | 1.1 |
| 74 EIC/SCH | 280-360 | 7.2(+9) | 0 | 2500±100 | | |
| 74 FIN/PIT | 298 | 1.0(+6) | - | - | 0. | 2.0 |
| NOTE: IN $O_2$ CARRIER GAS. | | | | | | |
| 74 FIN/PIT | 298 | 5.0(+6) | - | - | 0.6 | 1.4 |
| NOTE: IN $N_2$ CARRIER GAS | | | | | | |
| 74 BER/HUI | 235-362 | 5.4(+9) | 0 | 2557±167 | 0.4 | 1.6 |
| 74 JAP/WU | 298 | 1.1(+6) | - | - | 0.9 | 1.1 |
| 76 JAP/WU | 299 | 1.1(+6) | - | - | 0.9 | 1.1 |
| 76 WIL | 298 | 8.8(+5) | - | - | | |
| ---------- | | | | | | |
| $CD_2{=}CD_2 + O_3 \rightarrow$ products | | | | | | |
| ETHENE-$d_4$ + OZONE | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 1.4(+6) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + H \rightarrow CH_2{=}CH. + H_2$ | | | | | | |
| ETHENE + HYDROGEN ATOM | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: ≤0.0003 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + H \rightarrow CH_3CH_2$ [UPPER LIMIT k] | | | | | | |
| 73 FIE/MAH2 | 1200-1700 | 1.1(+14) | 0 | 4280 | | |
| NOTE: EVALUATION | | | | | | |
| 74 YAM2 | 1093-1213 | 1.9(+13) | 0 | 5185±1000 | 0.4 | 1.25 |
| 77 JUS/ROT | 1700-2000 | 5.0(+15) | 0 | 11500 | | |
| NOTE: TENTATIVE k | | | | | | |
| ---------- | | | | | | |
| $CD_2{=}CD_2 + H \rightarrow CD_2{=}CDH + D$ | | | | | | |
| ETHENE-$d_4$ + HYDROGEN ATOM | | | | | | |
| 74 YAM1 | 1000-1200 | 6.8(+12) | - | - | 0.7 | 1.4 |
| NOTE: AVERAGED k OVER GIVEN T RANGE | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_2{=}CH_2 + H \rightarrow CH_3CH_2\cdot$ | | | | | | |
| ETHENE + HYDROGEN ATOM | | | | | | |
| 71 OSB — REACTION ORDER: 2 | 298 | 3.7(+11) | - | - | | |
| 72 TEN/JON | 303-603 | 7.9(+11) | 0 | 365 | | |
| $CH_2{=}CH_2 + H \rightarrow CH_3CH_2^{*}\cdot$ | | | | | | |
| ETHENE + HYDROGEN ATOM | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 7.5(+11) | - | - | 0.9 | 1.1 |
| $CH_2{=}CH_2 + H \rightarrow CH_3CH_2\cdot^{\ddagger}$ | | | | | | |
| ETHENE + HYDROGEN ATOM | | | | | | |
| 77 WAN — REACTION ORDER: 2 | 298-373 | - | - | 1000 | | |
| $CH_2{=}CH_2 + D \rightarrow CH_2DCH_2\cdot$ | | | | | | |
| ETHENE + DEUTERIUM ATOM | | | | | | |
| 75 COW/MIC — REACTION ORDER: 2 | 297 | 4.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN EXCESS D. PRESSURE INDEPENDENT k WITHIN THE 1.5 TORR RANGE | 297 | 4.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN EXCESS $CH_2{=}CH_2$ STABLE k WITHIN THE 1-1.8 TORR. PRESSURE RANGE, BUT INCREASING TO $7.3\times10^{11}$ $cm^3mol^{-1}s^{-1}$ AT 4.2 TORR. | | | | | | |
| $CH_2{=}CH_2 + D \rightarrow CH_2DCH_2\cdot^{*}$ | | | | | | |
| ETHENE + DEUTERIUM ATOM | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 5.2(+11) | - | - | 0.9 | 1.1 |
| $CD_2{=}CD_2 + H \rightarrow CD_2HCD_2\cdot$ | | | | | | |
| ETHENE-$d_4$ + HYDROGEN ATOM | | | | | | |
| 71 OSB — REACTION ORDER: 2 | 298 | 5.4(+11) | - | - | | |
| 75 COW/MIC | 297 | 4.2(+11) | - | - | | |
| NOTE: IN EXCESS H, AT 1 TORR. k INCREASING TO $5.9\times10^{11}$ $cm^3mol^{-1}s^{-1}$ AT 4.9 TORR | | | | | | |
| $CD_2{=}CD_2 + H \rightarrow CD_2HCD_2\cdot^{*}$ | | | | | | |
| ETHENE-$d_4$ + HYDROGEN ATOM | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 6.9(+11) | - | - | 0.9 | 1.1 |
| $CD_2{=}CD_2 + D \rightarrow CD_3CD_2\cdot$ | | | | | | |
| ETHENE-$d_4$ + DEUTERIUM ATOM | | | | | | |
| 71 OSB — REACTION ORDER: 2 | 298 | 4.4(+11) | - | - | | |
| 75 COW/MIC | 297 | 1.3(+11) | - | - | | |
| NOTE: IN EXCESS D, AT 1 TORR. k INCREASING TO $2.8\times10^{11}$ $cm^3mol^{-1}s^{-1}$ AT 5 TORR | | | | | | |
| $CD_2{=}CD_2 + D \rightarrow CD_3CD_2\cdot^{*}$ | | | | | | |
| ETHENE-$d_4$ + DEUTERIUM ATOM | | | | | | |
| 75 MIH/SCH — REACTION ORDER: 2 | 295 | 5.1(+11) | - | - | 0.9 | 1.1 |
| $CH_2{=}CH_2 + H \rightarrow$ products | | | | | | |
| ETHENE + HYDROGEN ATOM | | | | | | |
| 74 LAU/LUE — REACTION ORDER: 2 | 298 | 2.5(+11) | - | - | | |
| $CH_2{=}CH_2 + H + M \rightarrow CH_3CH_2\cdot + M$ | | | | | | |
| ETHENE + HYDROGEN ATOM | | | | | | |
| 71 COW/KEI — REACTION ORDER: 2 | 298 | 2.3(+11) | - | - | 0.7 | 1.3 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD. 10-15 TORR. PRESSURE M=Ne,Ar | | | | | | |
| 71 BIR/EYR | 298 | 5.5(+11) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE K. M=$H_2$, OR Ar | | | | | | |
| 73 MIC/OSB | 298 | 9.7(+11) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH-PRESSURE K. | | | | | | |
| $CH_2{=}CH_2 + OH \rightarrow CH_2{=}CH\cdot + H_2O$ | | | | | | |
| ETHENE + HYDROXYL FREE RADICAL | | | | | | |
| 76 EKA/CAP — REACTION ORDER: 2 $k/k_{ref}$: 2.33 | 1300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_4 + OH \rightarrow CH_3\cdot + H_2O$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| 76 MIA/HEI $k/k_{ref}$: 0.26 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + OH \rightarrow .CH_2CH_2OH + CH_2{=}CH. + H_2O$ | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + OH \rightarrow$ products | | | | | | |
| ETHENE + HYDROXYL FREE RADICAL | | | | | | |
| 71 MCK/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 0.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 71 MCK/STE | 300 | 1.1(+12) | - | - | 0.7 | 1.3 |
| 73 FRA/HAC | 298 | 1.0(+12) | - | - | 0.7 | 1.3 |
| 73 SIM/ZEL1 | 210-460 | 4.5(+12) | 0 | 110 | | |
| 73 STU1 | 298 | 1.8(+12) | - | - | 0.7 | 1.3 |
| 75 FAS/CAR | 300 | 1.4(+12) | - | - | 0.9 | 1.1 |
| 75 COX | 300 | 5.7(+12) | - | - | 0.9 | 1.1 |
| 76 LIE/DAR2 | 305 | 5.2(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + OH + M \rightarrow .CH_2CH_2OH + M$ | | | | | | |
| ETHENE + HYDROXYL FREE RADICAL | | | | | | |
| 77 ATK/PER2 REACTION ORDER: 2 M: Ar | 299-425 | 1.3(+12) | 0 | 390±150 | | |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| 77 EVE/PAR2 | 296 | 6.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + OH + M \rightarrow$ products | | | | | | |
| ETHENE + HYDROXYL FREE RADICAL | | | | | | |
| 75 DAV/FIS REACTION ORDER: 2 M: He | 300 | 3.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| 75 GER/MUL1 M: $H_2O$ | 381 | 3.8(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR. | | | | | | |
| | 416 | 4.4(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR. | | | | | | |
| 76 DEW M: He | 296 | 2.4(+12) | - | - | | |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + HO_2 \rightarrow cy\text{-}CH_2CH_2O + OH$ | | | | | | |
| ETHENE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 WAL2 REACTION ORDER: 2 $k/k_{ref}$: 0.016 | 773 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $HCHO + HO_2 \rightarrow .CHO + H_2O_2$ | | | | | | |
| 73 WAL2 | 773 | 1.5(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| ETHENE + SULFUR ATOM | | | | | | |
| 71 COX/VAN REACTION ORDER: 2 | 298 | 9.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/O'C $k/k_{ref}$: 1.0 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| 72 DAV/KIE2 | 218-442 | 4.3(+12) | 0 | 795±40 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CD_2{=}CH_2 + S \rightarrow cy\text{-}CD_2CH_2S$ | | | | | | |
| ETHENE-1,1-$d_2$ + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 $k/k_{ref}$: 1.07 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| cis-$CHD{=}CHD + S \rightarrow$ cy-CHDCHS | | | | | | |
| cis-ETHENE-1,2-$d_2$ + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 $k/k_{ref}$: 1.04 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| $CD_2{=}CD_2 + S \rightarrow cy\text{-}CD_2CD_2S$ | | | | | | |
| ETHENE-$d_4$ + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 $k/k_{ref}$: 1.14 | 298-450 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| $CH_2{=}CH_2 + NO_2 \rightarrow$ products | | | | | | |
| ETHENE + NITROGEN OXIDE($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 2 | 298-373 | 2.0(+6) | 0 | 4100 | | |
| $CH_2{=}CH_2 + NO_3 \rightarrow$ products | | | | | | |
| ETHENE + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 5.6(+8) | - | - | 0.9 | 1.1 |
| $CH_2{=}CH_2 + CH \rightarrow$ products | | | | | | |
| ETHENE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 6.9(+13) | - | - | 0.9 | 1.1 |
| $CH_2{=}CH_2 + CH_3\cdot \rightarrow CH_2{=}CH\cdot + CH_4$ | | | | | | |
| ETHENE + METHYL FREE RADICAL | | | | | | |
| 76 CHE/BAC REACTION ORDER: 2 | 1038 | 1.0(+9) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| $CH_2{=}CH_2 + CH_3\cdot \rightarrow CH_3CH_2CH_2\cdot$ | | | | | | |
| ETHENE + METHYL FREE RADICAL | | | | | | |
| 72 TED/WAL REACTION ORDER: 2 | 335-424 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_2{=}CHF + CH_3\cdot \rightarrow CH_3CH_2CHF$ | | | | | | |
| $k/k_{ref}$: $7.2\times10^{2}\exp(+468\pm100/T)$ | | | | | | |
| REACTION ORDER: 2 | 335-424 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_2{=}CF_2 + CH_3\cdot \rightarrow CH_3CH_2CF_2$ | | | | | | |
| $k/k_{ref}$: $4.9\times10^{1}\exp(+2420\pm500/T)$ | | | | | | |
| | 335-424 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CF_2{=}CF_2 + CH_3\cdot \rightarrow CH_3CF_2CF_2$ | | | | | | |
| $k/k_{ref}$: $8.3\times10^{3}\exp(-1320\pm550/T)$ | | | | | | |
| | 335-424 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_2{=}CHCL + CH_3\cdot \rightarrow CH_3CH_2CHCl$ | | | | | | |
| $k/k_{ref}$: $2.9\times10^{2}\exp(+940\pm250/T)$ | | | | | | |
| | 335-424 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + CH_3\cdot \rightarrow CH_3CH_2CH(.)CH_2\cdot$ | | | | | | |
| $k/k_{ref}$: $1.1\times10^{4}\exp(+377\pm200/T)$ | | | | | | |
| 77 HCL/KER | 350-500 | 2.1(+11) | 0 | 3670±500 | 0.3 | 3.2 |
| NOTE: EVALUATION | | | | | | |
| $CH_2{=}CH_2 + CH_3O\cdot \rightarrow CH_3OCH_2CH_2\cdot$ | | | | | | |
| ETHENE + METHOXY FREE RADICAL | | | | | | |
| 75 LIS/MAS REACTION ORDER: 2 | 300 | 3.7(+7) | - | - | | |
| $CH_2{=}CH_2 + CN \rightarrow$ products | | | | | | |
| ETHENE + CYANOGEN FREE RADICAL | | | | | | |
| 77 SCH/WAG REACTION ORDER: 2 | 259-396 | 3.0(+13) | 0 | 0 | 0.8 | 1.2 |
| 77 SCH/WAG | 298 | 6.5(+13) | - | - | | |
| NOTE: $.CN^{\ddagger}(v=1)$ | | | | | | |
| $CH_2{=}CH_2 + CH_2{=}CH_2 \rightarrow cy\text{-}CH_2CH_2CH_2CH_2$ | | | | | | |
| ETHENE | | | | | | |
| 72 QUI/KNE REACTION ORDER: 2 | 723-786 | 6.9(+10) | 0 | 22040 | | |
| $CH_2{=}CH_2 + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow cis\text{-}CH_3CH(.)CH(CH_3)CH_2CH_2\cdot$ | | | | | | |
| ETHENE + cis-2-BUTENE | | | | | | |
| 77 SCA/BAC REACTION ORDER: 2 | 663-703 | 1.5(+12) | 0 | 24360 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES FOR EA AND FOUR K.S | | | | | | |
| $CH_2{=}CH_2 + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow trans\text{-}CH_3CH(.)CH(CH_3)CH_2CH_2\cdot$ | | | | | | |
| ETHENE + trans-2-BUTENE | | | | | | |
| 77 SCA/BAC REACTION ORDER: 2 | 663-703 | 4.1(+12) | 0 | 24660 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES FOR Ea AND FOUR k.s. | | | | | | |
| 77 SCA/BAC $k/k_{ref}$: 1.80 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| cis-$CH_3CH(.)CH(CH_3)CH_2CH_2$. | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + M \rightarrow CH_2{=}CH. + H + M$ | | | | | | |
| ETHENE | | | | | | |
| 73 RET/JUS REACTION ORDER: 2 M: Ar | 1675-2210 | 1.8(+17) | 0 | 39000 | | |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + M \rightarrow CH{\equiv}CH + H_2 + M$ | | | | | | |
| ETHENE | | | | | | |
| 77 JUS/RET REACTION ORDER: 2 M: Ar | 1700-2200 | 2.6(+17) | 0 | 39900±500 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_2{=}CH_2 + M \rightarrow CH_2{=}CH. + H + M$ | | | | | | |
| ETHENE | | | | | | |
| 77 JUS/RET REACTION ORDER: 2 M: Ar | 1700-2200 | 3.8(+17) | 0 | 49400±900 | 0.5 | 1.5 |
| ---------- | | | | | | |
| $CH_3CH_2. + O_2 \rightarrow CH_2{=}CH_2 + HO_2.$ | | | | | | |
| ETHYL FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 8.2(+10) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2. + H \rightarrow CH_3. + CH_3.$ | | | | | | |
| ETHYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 72 TEN/JON REACTION ORDER: 2 | 303-603 | 1.1(+14) | 0 | 435 | | |
| 74 CAM/MAR | 503-753 | 3.7(+13) | 0 | 0 | | |
| 74 PRA/VEL1 | 295 | 4.3(+13) | - | - | 0.9 | 1.1 |
| 76 PRA/VEL | 321-521 | 6.6(+13) | 0 | 112±35 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2. + H \rightarrow CH_2{=}CH_2 + H_2$ | | | | | | |
| ETHYL FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 74 CAM/MAR REACTION ORDER: 2 | 503-753 | 1.7(+12) | 0 | 0 | | |
| ---------- | | | | | | |
| $CH_3CH_2. + H_2 \rightarrow CH_3CH_3 + H.$ | | | | | | |
| ETHYL FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 2.2(+8) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2. + D_2 \rightarrow CH_3CH_2D + D.$ | | | | | | |
| ETHYL FREE RADICAL + DEUTERIUM MOLECULE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 8.3(+7) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2. + NO \rightarrow CH_3CH_2NO$ | | | | | | |
| ETHYL FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 74 PRA/VEL REACTION ORDER: 2 | 295 | 1.2(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2. + NO \rightarrow CH_3CH_2NO$ | | | | | | |
| ETHYL FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 76 PRA/VEL2 REACTION ORDER: 2 | 325-521 | 1.4(+11) | 0 | 0 | 0.6 | 1.6 |
| ---------- | | | | | | |
| $CH_3CH_2. + CO \rightarrow CH_3CH_2C(O).$ | | | | | | |
| ETHYL FREE RADICAL + CARBON MONOXIDE | | | | | | |
| 73 WAT/TRO REACTION ORDER: 2 | 238-378 | 1.5(+11) | 0 | 2420 | | |
| $CH_3CH_2. + CH_3 \rightarrow CH_3CH_2CH_3$ | | | | | | |
| ETHYL FREE RADICAL + METHYL FREE RADICAL | | | | | | |
| 72 TEN/JON REACTION ORDER: 2 | 303-603 | 2.5(+13) | 0 | 200 | | |
| ---------- | | | | | | |
| $CH_3CH_2. + CH_3CH_2. \rightarrow CH_2{=}CH_2 + CH_3CH_3$ | | | | | | |
| ETHYL FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.14 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2. + CH_3CH_2. \rightarrow CH_3CH_2CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| 75 HOO/SIM $k/k_{ref}$: 0.15 | 298-173 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2. + CH_3CH_2. \rightarrow CH_3CH_2CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2. + CH_3CH_2. \rightarrow CH_3CH_2CH_2CH_3$ | | | | | | |
| ETHYL FREE RADICAL | | | | | | |
| 72 TEN/JON REACTION ORDER: 2 | 303-603 | 7.6(+12) | 0 | 95 | | |
| 72 HIA/DEN2 | 350-410 | 4.0(+11) | 0 | 0±100 | | |
| NOTE: EVALUATION | | | | | | |
| 72 MAR/PUR | 350-950 | 2.5(+11) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| 72 PAC/PUR1 | 951 | 3.2(+11) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 74 SIG/MAR | 895-981 | 4.0(+11) | 0 | 0 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EVALUATION<br>75 HUG/MAR | 693-803 | 2.5(+11) | 0 | 0 | | |
| NOTE: EVALUATION<br>76 GOL/CHO | 860 | 4.5(+12) | - | - | | |
| NOTE: LOW PRESSURE k<br>76 PAR/QUI | 298 | 7.8(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3CH_2NO \rightarrow (CH_3CH_2)_2NO\cdot$<br>ETHYL FREE RADICAL + ETHANE, NITROSO-<br>72 TAN/LAM REACTION ORDER: 2<br>NOTE: LOWER LIMIT k. | 329 | ≥1.4(+10) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_2{=}CHCH_2CH_2\cdot \rightarrow CH_2{=}CH_2 + CH_3CH_3 + CH_2{=}CHCH_2CH_3 + CH_2{=}CHCH{=}CH_2$<br>ETHYL FREE RADICAL + 3-BUTENYL FREE RADICAL<br>75 STE/RAB REACTION ORDER: 2 $k/k_{ref}$: 0.30<br>NOTE: $k_{ref}$: $CH_3CH_2\cdot + CH_2{=}CHCH_2CH_2\cdot \rightarrow CH_2{=}CHCH_2CH_2CH_2CH_3$ | 298 | - | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_3 + CH_3CH_2CH(\cdot)CH_3 + CH_3CH_2CH_2CH_2\cdot$<br>ETHYL FREE RADICAL + BUTANE<br>72 PAC/PUR1 REACTION ORDER: 2<br>74 HUG/MAR<br>76 YAM/NAM | 869-952<br>895-981<br>980-1060 | 3.2(+13)<br>7.9(+13)<br>3.2(+12) | 0<br>0<br>0 | 10120±860<br>11160±810<br>6440±1360 | 0.4<br>0.4<br>0.3 | 2.5<br>2.5<br>3.5 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3COCOCH_3 \rightarrow CH_3\cdot + CH_3CH_2COCOCH_3$<br>ETHYL FREE RADICAL + 2,3-BUTANEDIONE<br>76 SCH/KNO REACTION ORDER: 2 | 525-556 | 2.5(+8) | 0 | 3575±300 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3COCOCH_3 \rightarrow CH_3CH_3 + \cdot CH_2COCOCH_3$<br>ETHYL FREE RADICAL + 2,3-BUTANEDIONE<br>76 SCH/KNO REACTION ORDER: 2 | 525-556 | 4.0(+12) | 0 | 5390±1560 | 0.1 | 16.0 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3COCOCH_3 \rightarrow CH_3CH_2COCH_3 + CH_3C(O)\cdot$<br>ETHYL FREE RADICAL + 2,3-BUTANEDIONE<br>76 SCH/KNO REACTION ORDER: 2 | 525-556 | 4.0(+8) | 0 | 2970±300 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3CF_2N{=}NCH_2CH_3 \rightarrow CH_3CH_3 + \cdot CH_2CH_2N{=}NCH_2CH_3$<br>ETHYL FREE RADICAL + DIAZENE, DIETHYL-<br>76 SCH/KNO REACTION ORDER: 2 | 525-556 | 7.9(+11) | 0 | 3775±1350 | 0.1 | 10.0 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3CH{=}CHCH_2CH_2\cdot \rightarrow CH_2{=}CH_2 + CH_3CH{=}CHCH_2CH_3$<br>ETHYL FREE RADICAL + 3-PENTENYL FREE RADICAL<br>75 STE/RAB REACTION ORDER: 2 $k/k_{ref}$: 0.093<br>NOTE: $k_{ref}$: $CH_3CH_2\cdot + CH_3CH{=}CHCH_2CH_2\cdot \rightarrow CH_3CH{=}CHCH_2CH_2CH_2CH_3$ | 298 | - | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3CH{=}CHCH_2CH_2\cdot \rightarrow CH_3CH_3 + cis\text{-}CH_3CH{=}CHCH{=}CH_2$<br>ETHYE FREE RADICAL + 3-PENTENYL FREE RADICAL<br>75 STE/RAB REACTION ORDER: 2 $k/k_{ref}$: 0.087<br>NOTE: $k_{ref}$: $CH_3CH_2\cdot + CH_3CH{=}CHCH_2CH_2\cdot \rightarrow CH_3CH{=}CHCH_2CH_2CH_2CH_3$ | 298 | - | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3COCOCH_2CH_3 \rightarrow CH_3CH_3 + CH_3COCOCH(\cdot)CH_3$<br>ETHYL FREE RADICAL + 2,3-PENTANEDIONE<br>74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 4.5<br>NOTE: $k_{ref}$: $CH_3CH_2\cdot + CH_3COCOCH_2CH_3 \rightarrow CH_3CH_3 + \cdot CH_2COCOCH_2CH_3$ | 362-398 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3COCOCH_2CH_3 \rightarrow CH_3CH_3 + CH_3COCOCH_2CH_2\cdot$<br>ETHYL FREE RADICAL + 2,3-PENTANEDIONE<br>74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 0.3<br>NOTE: $k_{ref}$: $CH_3CH_2\cdot + CH_3COCOCH_2CH_3 \rightarrow CH_3CH_3 + \cdot CH_2COCOCH_2CH_3$ | 362-398 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2\cdot + CH_3COCOCH_2CH_3 \rightarrow CH_3CH_3 + \cdot CH_2COCOCH_2CH_3 + CH_3COCOCH(\cdot)CH_3 + CH_3COCOCH_2CH_2\cdot$<br>ETHYL FREE RADICAL + 2,3-PENTANEDIONE<br>74 SCH/KNO REACTION ORDER: 2<br>NOTE: $k_{ref}$: $CH_3CH_2\cdot + CH_3COCOCH_2CH_3 \rightarrow CH_3CH_2COCH_2CH_3 + CH_3C(O)\cdot$ | 362-398 | - | - | - | 0.2 | 6.3 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $k/k_{ref}$: 50.12exp(-1410±1160/T) | | | | | | |
| $CH_3CH_2\cdot + CH_3(CH_2)_4CH_3 \rightarrow CH_3CH_3 + [C_6H_{13}\cdot]$ | | | | | | |
| ETHYL FREE RADICAL + HEXANE | | | | | | |
| 76 YAM REACTION ORDER: 2 | 973-1088 | 1.8(+13) | 0 | 8050 | | |
| $CH_3CH_3 \rightarrow CH_3\cdot + CH_3\cdot$ | | | | | | |
| ETHANE | | | | | | |
| 72 FAC/PUR2 REACTION ORDER: 1 | 920-1040 | 5.0(+16) | 0 | 44510 | | |
| 76 CLA/QUI | 778-878 | 1.2(+16) | 0 | 43530±250 | 0.7 | 1.4 |
| $CH_3CH_3^* \rightarrow CH_3 + CH_3$ | | | | | | |
| ETHANE | | | | | | |
| 76 SBI/OBI REACTION ORDER: 1 | 298 | 5.0(+9) | - | - | | |
| NOTE: k(1630A°)=1.2k(1630A°) | | | | | | |
| $CD_3CD_3 \rightarrow CD_3\cdot + CD_3\cdot$ | | | | | | |
| ETHANE-D6 | | | | | | |
| 76 CLA/QUI REACTION ORDER: 1 | 778-878 | 3.2(+16) | 0 | 44270±120 | 0.9 | 1.2 |
| $CH_3CH_3 \rightarrow$ products | | | | | | |
| ETHANE | | | | | | |
| 71 ILL/WEL REACTION ORDER: 1 | 993-1097 | 4.6(+15) | 0 | 36635 | | |
| 72 ILL/SZA | 933-1097 | 6.4(+14) | 0 | 34700 | 0.9 | 1.1 |
| 74 EAK/NOV | 973-1123 | 1.4(+16) | 0 | 38850±1500 | | |
| $CH_3CH_3 + O \rightarrow CH_2 + HCHO + H_2$ | | | | | | |
| ETHANE + OXYGEN ATOM | | | | | | |
| 71 AVR/KOLI REACTION ORDER: 2 | 313-523 | 1.2(+12) | 0 | 2160±350 | 0.5 | 1.5 |
| $CH_3CH_3 + O \rightarrow CH_3CH_2\cdot + OH$ | | | | | | |
| ETHANE + OXYGEN ATOM | | | | | | |
| 71 AVR/KOLI REACTION ORDER: 2 | 313-523 | 2.3(+13) | 0 | 3780±350 | 0.5 | 1.5 |
| 71 PAP/ASH | 300-365 | 2.8(+13) | 0 | 3270±125 | 0.7 | 1.5 |
| $CH_3CH_3 + O^*(^1D) \rightarrow CH_3CH_2\cdot + OH$ | | | | | | |
| ETHANE + OXYGEN ATOM | | | | | | |
| 76 FLE/HUS REACTION ORDER: 2 | 300 | 4.4(+14) | - | - | 0.9 | 1.1 |
| $CH_3CH_3 + O \rightarrow$ products | | | | | | |
| ETHANE + OXYGEN ATOM | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 | 300 | 2.7(+12) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $CH_3CH_3 + O^*(^1D) \rightarrow$ products | | | | | | |
| ETHANE + OXYGEN ATOM | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.512 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_4C + O^*(^1D) \rightarrow$ products | | | | | | |
| $CH_3CH_3 + O + M \rightarrow$ products | | | | | | |
| ETHANE + OXYGEN ATOM | | | | | | |
| 73 GAE/GLA REACTION ORDER: 2 M: $N_2$ | 300 | 2.9(+12) | - | - | | |
| NOTE: LIMITING HIGH-PRESSURE k. GIVEN WITH CAUTION | | | | | | |
| $CH_3CH_3 + H \rightarrow CH_3CH_2\cdot + H_2$ | | | | | | |
| ETHANE + HYDROGEN ATOM | | | | | | |
| 72 KAI/KOR REACTION ORDER: 2 | 1073-1173 | 3.3(+12) | - | - | 0.2 | 1.8 |
| 73 CLA/DOVI | 300-1800 | 5.4(+2) | 3.5 | 2620±35 | 0.9 | 1.1 |
| 74 CAM/MAR | 290-1290 | 1.3(+14) | 0 | 4720±110 | 0.8 | 1.2 |
| NOTE: RECOMMENDED k | | | | | | |
| 74 CAM/MAR | 503-753 | 1.9(+14) | 0 | 4920±190 | 0.7 | 1.3 |
| 74 KAI/SHE | 1023-1123 | 2.4(+12) | - | - | 0.7 | 1.3 |
| 75 NAM/SHE | 800-900 | 1.5(+11) | - | - | 0.7 | 1.3 |
| $CH_3CH_3 + OH \rightarrow CH_3CH_2\cdot + H_2O$ | | | | | | |
| ETHANE + HYDROXYL FREE RADICAL | | | | | | |
| 75 OVE/PAR REACTION ORDER: 2 | 295 | 1.6(+11) | - | - | 0.9 | 1.1 |
| 75 BUC/BOO $k/k_{ref}$: 9.6 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_4 + OH \rightarrow CH_3\cdot + H_2O$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 HOW/EVE2 | 296 | 1.7(+11) | - | - | 0.8 | 1.2 |
| 76 EBA/CAP $k/k_{ref}$: 2.88 | 1300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_4 + OH \rightarrow CH_3\cdot + H_2O$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + OH + M \rightarrow CH_3CH_2\cdot + H_2O + M$ | | | | | | |
| ETHANE + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 381 | 4.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| 75 GOR/MUL1 M: $H_2O$ | 416 | 4.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR. | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + HO_2\cdot \rightarrow CH_3CH_2\cdot + H_2O_2$ | | | | | | |
| ETHANE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 $k/k_{ref}$: 0.028 | 713 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_3 + HCHO \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + HO_2 \rightarrow CH_3CH_2\cdot + H_2O_2$ | | | | | | |
| ETHANE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 BAL/FUL $k/k_{ref}$: 0.03 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HCHO + HO_2 \rightarrow .CHO + H_2O_2$ | 773 | 3.0(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + S^*(^1D) \rightarrow$ products | | | | | | |
| ETHANE + SULFUR ATOM | | | | | | |
| 72 LIT/DAL REACTION ORDER: 2 $k/k_{ref}$: 0.17 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + S^*(^1D) \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + CH_2 \rightarrow CH_3CH_2CH_3$ | | | | | | |
| ETHANE + METHYLENE FREE RADICAL | | | | | | |
| 73 BAL/CRU REACTION ORDER: 2 | 304 | 2.9(+12) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_3 + CH_3\cdot \rightarrow CH_3CH_2\cdot + CH_4$ | | | | | | |
| ETHANE + METHYL FREE RADICAL | | | | | | |
| 72 PAC/PUR2 REACTION ORDER: 2 | 920-1040 | 5.0(+14) | 0 | 10830±2410 | 0.1 | 10. |
| 73 CIA/DEVI | 300-1800 | 5.5(-1) | 4.0 | 4170±15 | 0.9 | 1.1 |
| ETHANE + METHYL FREE RADICAL | | | | | | |
| 74 YAM/RYB | 980-1130 | 3.0(+12) | 0 | 6840±1100 | | |
| 76 EBA/WES2 | 1055-1325 | 3.2(+13) | 0 | 9000 | 0.6 | 1.8 |
| 76 CHE/BAC | 1038 | 1.3(+10) | - | - | 0.8 | 1.2 |
| NOTE: MEASURED k VALUES ALSO AT T=880K, 995K AND 1068K. NON-ARRHENIUS BEHAVIOUR | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + CN \rightarrow CH_3CH_2\cdot + HCN$ | | | | | | |
| ETHANE + CYANOGEN FREE RADICAL | | | | | | |
| 72 BUL/COO REACTION ORDER: 2 | 300-415 | 1.5(+13) | 0 | 0 | | |
| NOTE: ALTERNATIVE EXPRESSION: $k=2.4\times10^{13}\exp(-192/T)\,cm^3mol^{-1}s^{-1}$ | | | | | | |
| 74 SCH/SCH | 298 | 7.9(+12) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_3 + CH{\equiv}C\cdot \rightarrow CH_3CH_2\cdot + CH{\equiv}CH$ | | | | | | |
| ETHANE + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUI/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.54 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH{\equiv}CBr + CH{\equiv}C\cdot \rightarrow Br + CH{\equiv}CC{\equiv}CH$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + CH_3CH_2O\cdot \rightarrow CH_3CH_2\cdot + CH_3CH_2OH$ | | | | | | |
| ETHANE + ETHOXY FREE RADICAL | | | | | | |
| 74 MCS/POL REACTION ORDER: 2 | 593 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_3CH_2O\cdot \rightarrow HCHO + CH_3$ [$k/k_{ref}$: $7.0\times10^{-6}\,cm^3mol^{-1}$] | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_3 + (CH_3)_2CH\cdot \rightarrow CH_3CH_2\cdot + CH_3CH_2CH_3$ | | | | | | |
| ETHANE + ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 74 SZI/MAR REACTION ORDER: 2 | 496-548 | 2.5(+10) | 0 | 6990±400 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $CH_3CH_3 + M \rightarrow CH_3\cdot + CH_3\cdot + M$ | | | | | | |
| ETHANE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 BUR/SKI REACTION ORDER: 1 M: Ar | 1000-1500 | 7.9(+16) | 0 | 45050 | | |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| ---------- | | | | | | |
| $.CH{=}C{=}O + e \rightarrow CO + CO + H$ | | | | | | |
| ETHENYL, 2-OXO-, FREE RADICAL + OXYGEN ATOM | | | | | | |
| 73 JEN/BAY1 REACTION ORDER: 2 | 298 | 1.2(+12) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $.CH{=}C{=}O + e \rightarrow$ products | | | | | | |
| ETENYL, 2-OXO-, FREE RADICAL + OXYGEN ATOM | | | | | | |
| 73 JEN/BAY2 REACTION ORDER: 2 | 296 | 2.2(+10) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |
| $.CH{=}C{=}O + e_2 \rightarrow$ products | | | | | | |
| ETHENYL, 2-OXO-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 73 JEN/BAY2 REACTION ORDER: 2 $k/k_{ref}$: 0.018 | 296 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $.CH{=}C{=}O + O \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| | 296 | 2.2(+10) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $.CH{=}C{=}O + CH{\equiv}CH \rightarrow$ products | | | | | | |
| ETHENYL, 2-OXO-, FREE RADICAL + ETHYNE | | | | | | |
| 73 JEN/BAY1 REACTION ORDER: 2 | 298 | 5.0(+8) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + O \rightarrow .CHO + .CHO$ | | | | | | |
| ETHENONE + OXYGEN ATOM | | | | | | |
| 74 MAC/THR2 REACTION ORDER: 2 | 293 | 3.4(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + e \rightarrow$ products | | | | | | |
| ETHENONE + OXYGEN ATOM | | | | | | |
| 73 JEN/BAY2 REACTION ORDER: 2 | 296 | 1.7(+11) | - | - | 0.8 | 1.2 |
| 75 GAF/ATK1 | 296 | 2.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + H \rightarrow CO + CH_3.$ | | | | | | |
| ETHENONE + HYDROGEN ATOM | | | | | | |
| 75 SLE/WAR1 REACTION ORDER: 2 | 218-363 | 3.6(+12) | 0 | 1180±100 | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + CH \rightarrow HCHO + .CHO$ | | | | | | |
| ETHENONE + HYDROXYL FREE RADICAL | | | | | | |
| 77 VAN/VAN REACTION ORDER: 2 | 480-1000 | 2.8(+13) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| ---------- | | | | | | |
| $CD_2{=}C{=}O + CD_2 \rightarrow CO + CD_2{=}CD_2$ | | | | | | |
| ETHENONE-$d_2$ + METHYLENE-$d_2$ FREE RADICAL | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 $k/k_{ref}$: 6.6 | 653 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_4C + CD_2 \rightarrow (CH_3)_3CCH_2. + CD_2H$ | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + {}^1CH_2{}^*: \rightarrow CO + CH_2{=}CH_2$ | | | | | | |
| ETHENONE + METHYLENE FREE RADICAL | | | | | | |
| 74 LAU/BAS REACTION ORDER: 2 | 298 | 1.9(+13) | - | - | 0.6 | 1.4 |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| 77 FIL/REB | 298 | 2.1(+12) | - | - | | |
| | 298 | 1.8(+13) | - | - | | |
| NOTE: ${}^1CH_2{}^*$: $({}^1B_1)$ STATE | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + CH_2{=}C{=}O \rightarrow cy\text{-}C_4H_4O_2$ | | | | | | |
| ETHENONE | | | | | | |
| 72 BIA/DAV REACTION ORDER: 2 | 498-596 | 1.8(+8) | 0 | 37240 | | |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + CH_3COOH \rightarrow (CH_3CO)_2O$ | | | | | | |
| ETHENONE + ACETIC ACID | | | | | | |
| 76 BIA/VAY REACTION ORDER: 2 | 368-489 | 1.3(+9) | 0 | 6000±110 | 0.8 | 1.3 |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + CH_3CH_2COOH \rightarrow CH_3CH_2C(O)OC(O)CH_3$ | | | | | | |
| ETHENONE + PROPANOIC ACID | | | | | | |
| 76 BIA/VAY REACTION ORDER: 2 | 368-489 | 1.7(+9) | 0 | 6100±90 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_2{=}C{=}O + CH_3CH_2CH_2COOH \rightarrow CH_3CH_2CH_2C(O)OC(O)CH_3$ | | | | | | |
| ETHENONE + BUTANOIC ACID | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 ELA/VAY REACTION ORDER: 2 | 428 | 1.3(+3) | - | - | | |
| $CH_2{=}C{=}O + (CH_3)_2CHCOOH \rightarrow (CH_3)_2CHC(O)OC(O)CH_3$ | | | | | | |
| ETHENONE + PROPANOIC ACID, 2-METHYL- | | | | | | |
| 76 ELA/VAY REACTION ORDER: 2 | 428 | 1.6(+3) | - | - | | |
| $CH_2{=}C{=}O + (CH_3)_3CCOOH \rightarrow (CH_3)_3CC(O)OC(O)CH_3$ | | | | | | |
| ETHENONE + PROPANOIC ACID, 2,2-DIMETHYL- | | | | | | |
| 76 ELA/VAY REACTION ORDER: 2 | 368-489 | 1.5(+9) | 0 | 5750±100 | 0.8 | 1.3 |
| $CH_2{=}C{=}O + (CH_3)_3CCH_2COOH \rightarrow (CH_3)_3CCH_2C(O)OC(O)CH_3$ | | | | | | |
| ETHENONE + BUTANOIC ACID, 3,3-DIMETHYL- | | | | | | |
| 76 ELA/VAY REACTION ORDER: 2 | 428 | 1.6(+3) | - | - | | |
| $CH_3C(O)\cdot \rightarrow CH_3 + CO$ | | | | | | |
| ETHYL, OXO-, FREE RADICAL | | | | | | |
| 73 FRE/VIN REACTION ORDER: 1 | 326 | 1.9(+1) | - | - | 0.8 | 1.2 |
| 76 WAT/WIL | 333-413 | 1.6(+13) | 0 | 8650±250 | 0.5 | 2.5 |
| $CH_3C(O)\cdot + O_2 \rightarrow CH_3C(O)OO\cdot$ | | | | | | |
| ETHYL, 1-OXO-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 74 DIX/SKI1 REACTION ORDER: 2 | 336-357 | 1.2(+10) | - | - | 0.7 | 1.3 |
| $CH_3C(O)\cdot + H \rightarrow CH_3\cdot + \cdot CHO$ | | | | | | |
| ETHYL, 1-OXO-, FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 75 SIE/WAR1 REACTION ORDER: 2 $k/k_{ref}$: 0.37 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3C(O)\cdot + H \rightarrow CH_2{=}C{=}O + H + CH_3\cdot + \cdot CHO$ | | | | | | |
| $CH_3C(O)\cdot + H \rightarrow CH_2{=}C{=}O + H_2$ | | | | | | |
| ETHYL, 1-OXO-, FREE RADICAL + HYDROGEN ATOM | | | | | | |
| 75 SIE/WAR1 REACTION ORDER: 2 $k/k_{ref}$: 0.63 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3C(O)\cdot + M \rightarrow CH_2{=}C{=}O + H_2 + CH_3\cdot + \cdot CHO$ | | | | | | |
| $CH_3C(O)\cdot + CH_2{=}CHCH{=}CH_2 \rightarrow CH_3COCH_2CH(\cdot)CH{=}CH_2$ | | | | | | |
| ETHYL, 1-OXO-, FREE RADICAL + 1,3-BUTADIENE | | | | | | |
| 73 ENC/LIS REACTION ORDER: 2 | 333-397 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3C(O)\cdot (+M) \rightarrow CH_3\cdot + CO(+M)$ | | | | | | |
| $k/k_{ref}$: $1.6\times10^{3}\exp(+5280\pm500/T)$ | | | | | | |
| $CH_3C(O)\cdot + M \rightarrow CH_3\cdot + CO + M$ | | | | | | |
| ETHYL, 1-OXO-, FREE RADICAL | | | | | | |
| 74 SZI/WAL REACTION ORDER: 1 | 507 | 2.0(+13) | 0 | 10970±900 | 0.6 | 1.6 |
| NOTE: EVALUATION. LIMITING HIGH PRESSURE k. $M{=}N_2$, Ar, cy-$C_4H_8$ | | | | | | |
| $CH_3C(O)OO\cdot + NO \rightarrow CH_3\cdot + CO_2 + NO_2$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 76 CEX/DER3 REACTION ORDER: 2 $k/k_{ref}$: 1.7 | 296 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3C(O)O_2\cdot + NO_2 \rightarrow CH_3C(O)O_2NO_2$ | | | | | | |
| $CH_3C(O)OO\cdot + NO \rightarrow CH_3C(O)O\cdot + NO_2$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 77 CEX/REF REACTION ORDER: 2 | 300 | 1.6(+12) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 77 BEN/KEN | 298-318 | 2.0(12) | - | - | | |
| $CH_3C(O)OO\cdot + NO_2 \rightarrow CH_3C(O)OONO_2$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 77 CEX/REF REACTION ORDER: 2 $k/k_{ref}$: 0.54 | 294-328 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $CH_3C(O)OO\cdot + NO \rightarrow CH_3C(O)O\cdot + NO_2$ | | | | | | |
| 77 CEX/REF | 300 | 8.4(+11) | - | - | 0.1 | 10.0 |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $CH_3C(O)OO\cdot + HCHO \rightarrow CH_3C(O)OOH + \cdot CHO$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + FORMALDEHYDE | | | | | | |
| 74 DIX/SKI2 REACTION ORDER: 2 $k/k_{ref}$: 2.4 | 119-188 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3C(O)OO\cdot + CH_3CHO \rightarrow CH_3C(O)OOH + CH_3C(O)\cdot$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3C(O)OO. + CH_3CH{=}CH_2 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3)CHCH_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + PROPENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 6.4(+6) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + CH_3CH_2CH{=}CH_2 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3CH_2)CHCH_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + 1-BUTENE | | | | | | |
| 74 DIA/WAD REACTION ORDER: 2 | 393 | 3.5(+7) | - | - | | |
| 75 SEL/WAD | 357-410 | 8.7(+10) | 0 | 3480±420 | 0.3 | 3.0 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3)CHCH(CH_3)O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + cis-2-BUTENE | | | | | | |
| 72 RAY/WAD REACTION ORDER: 2 | 457 | 2.0(+9) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 75 DIA/SEL | 393 | 7.5(+7) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3)CHCH(CH_3)O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + trans-2-BUTENE | | | | | | |
| 75 DIA/SEL REACTION ORDER: 2 | 393 | 1.2(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + (CH_3)_2C{=}CH_2 \rightarrow CH_3. + CO_2 + cy\text{-}[(CH_3)_2]CCH_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + 1-PROPENE, 2-METHYL-, | | | | | | |
| 75 SEL/WAD REACTION ORDER: 2 | 357-410 | 1.9(+11) | 0 | 3010±1410 | | |
| ---------- | | | | | | |
| $CH_3C(O)OO. + cis\text{-}CH_3CH_2CH{=}CHCH_3 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3CH_2)CHCH(CH_3)O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + cis-2-PENTENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 1.4(+8) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + trans\text{-}CH_3CH_2CH{=}CHCH_3 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3CH_2)CHCH(CH_3)O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + trans-2-PENTENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 1.4(+8) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + CH_3CH_2C(CH_3){=}CH_2 \rightarrow CH_3. + CO_2 + cy\text{-}[(CH_3CH_2)C(CH_2)]CH_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + 1-BUTENE, 2-METHYL- | | | | | | |
| 74 DIA/WAD REACTION ORDER: 2 | 393 | 5.0(+8) | - | - | | |
| 77 DIA/WAD | 393 | 1.5(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + (CH_3)_2CHCH{=}CH_2 \rightarrow CH_3. + CO_2 + cy\text{-}[(CH_3)_2CH]CHCH_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + 1-BUTENE, 3-METHYL- | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 1.3(+7) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + CH_3CH{=}C(CH_3)_2 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3)CHC(CH_3)_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + 2-BUTENE, 2-METHYL- | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 370-410 | 1.2(+11) | 0 | 1965±110 | 0.8 | 1.3 |
| ---------- | | | | | | |
| $CH_3C(O)OO. + CH_3CH_2CH_2CH_2CH{=}CH_2 \rightarrow CH_3. + CO_2 + cy\text{-}(CH_3CH_2CH_2CH_2)CHCH_2O$ | | | | | | |
| ETHYLDIOXY, 1-OXO-, FREE RADICAL + 1-HEXENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 2.2(+7) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3CHO \rightarrow CH_3. + .CHO$ | | | | | | |
| ACETALDEHYDE | | | | | | |
| 73 BAR/MAR REACTION ORDER: 1 | 768-813 | 3.9(+16) | 0 | 40100±700 | 0.2 | 1.8 |
| 75 COL/NAE | 800-1225 | 7.1(+15) | 0 | 41160±500 | 0.7 | 1.6 |
| ---------- | | | | | | |
| $CH_3CHO + O \rightarrow CH_2 + HCHO + CO + CO_2 + H_2$ | | | | | | |
| 74 MAC/THR1 | 300 | 2.9(+11) | - | - | 0.9 | 1.1 |
| 77 SIN/IRW | 298-472 | 7.2(+12) | 0 | 986±77 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3CHO + O_2 \rightarrow CH_3C(O). + HO_2$ | | | | | | |
| ACETALDEHYDE + OXYGEN MOLECULE | | | | | | |
| 77 COL/NAE REACTION ORDER: 2 | 1030-1115 | 2.0(+13) | 0.5 | 21240±600 | 0.5 | 2.0 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CHO + O_2 + M \rightarrow CH_3C(O)OOH + M$ | | | | | | |
| ACETALDEHYDE + OXYGEN MOLECULE | | | | | | |
| 76 BRY/LEV REACTION ORDER: 3 M: $O_3$ | 393-473 | 5.0(+17) | 0 | 7550±850 | 0.1 | 7 |
| ---------- | | | | | | |
| $CH_3CHO + O_3 \rightarrow$ products | | | | | | |
| ACETALDEHYDE + OZONE | | | | | | |
| 73 SIE/NIK2 REACTION ORDER: 2 | 298 | 2.0(+4) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CHO + H \rightarrow CH_3C(O). + H_2$ | | | | | | |
| ACETALDEHYDE + HYDROGEN ATOM | | | | | | |
| 73 ADE/WAG1 REACTION ORDER: 2 | 295-389 | 2.6(+12) | 0 | 1310±75 | 0.9 | 1.1 |
| 75 SIE/WAR1 $k/k_{ref}$: 0.46 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}C{=}O + H \rightarrow CH_3. + CO$ | | | | | | |
| ACETALDEHYDE + HYDROGEN ATOM | | | | | | |
| 73 WHY/MIC2 | 298-500 | 1.3(+13) | 0 | 1660±60 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3CHO + OH \rightarrow CH_3C(O). + H_2O$ | | | | | | |
| ACETALDEHYDE + HYDROXYL FREE RADICAL | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 0.9 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 71 MCR/STE | 300 | 9.0(+12) | - | - | 0.7 | 1.3 |
| 76 COX/DER | 296 | 1.2(+13) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + HO_2 \rightarrow CH_3C(O). + H_2O_2$ | | | | | | |
| ACETALDEHYDE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 77 COL/NAE REACTION ORDER: 2 | 1030-1115 | 1.7(+12) | 0 | 5350 | 0.3 | 4.0 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + NO_2 \rightarrow CH_3C(O). + HONO$ | | | | | | |
| ACETALDEHYDE + NITROGEN OXIDE($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 2 | 298-373 | 1.6(+5) | 0 | 3475 | | |
| 72 DAV/COR | 295 | 8.6(0) | - | - | 0.9 | 1.1 |
| NOTE: E=12900±600cal/mole(E/R=6490±300°K) REPORTED FOR T RANGE 295-395K | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + NO_3 \rightarrow CH_3C(O). + HONO_2$ | | | | | | |
| ACETALDEHYDE + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 74 MCR/NIK REACTION ORDER: 2 | 300 | 7.2(+8) | - | - | 0.7 | 1.3 |
| NOTE: BEST FIT OF EXPERIMENTAL DATA | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + CH_3. \rightarrow CH_3C(O). + CH_4$ | | | | | | |
| ACETALDEHYDE + METHYL FREE RADICAL | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713-813 | 1.6(+12) | 0 | 4125±250 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + CH_3. \rightarrow CH_3C(O). + .CH_2CHO + CH_4$ | | | | | | |
| ACETALDEHYDE + METHYL FREE RADICAL | | | | | | |
| 76 EAR/BER REACTION ORDER: 2 $k/k_{ref}$: 2.7 | 785 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CDO + CH_3. \rightarrow .CH_3C(O). + CH_3D$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CDO + CH_3. \rightarrow .CH_2CDO + CH_4$ | | | | | | |
| ACETALDEHYDE-1-d + METHYL FREE RADICAL | | | | | | |
| 76 EAR/BER REACTION ORDER: 2 $k/k_{ref}$: 0.62 | 785 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CDO + CH_3. \rightarrow CH_3C(O). + CH_3D$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + CH_3O. \rightarrow CH_3C(O). + CH_3OH$ | | | | | | |
| ACETALDEHYDE + METHOXY FREE RADICAL | | | | | | |
| 75 WEA/MEA REACTION ORDER: 2 $k/k_{ref}$: 1.5 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $O_2 + CH_3O. \rightarrow HO_2. + HCHO$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CHO + M \rightarrow CH_3 + .CHO + M$ | | | | | | |
| ACETALDEHYDE | | | | | | |
| 75 BRN/SPI REACTION ORDER: 1 M: Ar | 1400-1600 | 1.2(+16) | 0 | 41140±480 | | |
| NOTE: LIMITING HIGH-PRESSURE k. | | | | | | |
| 76 SPIN/WAG M: Ar | 1350-1650 | 1.2(+16) | 0 | 41150±500 | | |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| cy-$CH_2CH_2O$ + $NO_2$ + $NO_2$ → products | | | | | | |
| OXIRANE + NITROGEN OXIDE($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 3 | 298-373 | 1.3(+12) | 0 | 1860 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| ---------- | | | | | | |
| cy-$CH_2CH_2S$ + H → $CH_2$=$CH_2$ + SH | | | | | | |
| THYIRANE + HYDROGEN ATOM | | | | | | |
| 77 LEE/STI REACTION ORDER: 2 | 223-423 | 1.7(+13) | 0 | 946±12 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3COOH$ + $CH_2$=C=O → $(CH_3CO)_2O$ | | | | | | |
| ACETIC ACID + ETHENONE | | | | | | |
| 76 BIA/VAY REACTION ORDER: 2 | 368-489 | 1.3(+9) | 0 | 6000±110 | 0.8 | 1.3 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $CH_3CH$=$CH_2$ → $CH_3COOH$ + cy-$(CH_3)CHCH_2O$ | | | | | | |
| ETHANEPEROXOIC ACID + PROPENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 2.3(0) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $CH_3CH_2CH$=$CH_2$ → $CH_3COOH$ + cy-$(CH_3CH_2)CHCH_2O$ | | | | | | |
| ETHANEPEROXOIC ACID + 1-BUTENE | | | | | | |
| 75 SEL/WAD REACTION ORDER: 2 | 357-410 | 4.8(+11) | 0 | 9920±1240 | 0.04 | 25.0 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + cis-$CH_3CH$=$CHCH_3$ → $CH_3COOH$ + cy-$(CH_3)CHCH(CH_3)O$ | | | | | | |
| ETHANEPEROXOIC ACID + cis-2-BUTENE | | | | | | |
| 75 DIA/SEL REACTION ORDER: 2 | 393 | 3.2(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + trans-$CH_3CH$=$CHCH_3$ → $CH_3COOH$ + cy-$(CH_3)CHCH(CH_3)O$ | | | | | | |
| ETHANEPEROXOIC ACID + trans-2-BUTENE | | | | | | |
| 75 DIA/SEL REACTION ORDER: 2 | 393 | 3.2(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $CH_3CH$=$C(CH_3)_2$ → $CH_3COOH$ + cy-$(CH_3)CHC(CH_3)_2O$ | | | | | | |
| ETHANEPEROXOIC ACID + 1-PROPENE, 2-METHYL- | | | | | | |
| 75 SEL/WAD REACTION ORDER: 2 | 357-410 | 4.3(+10) | 0 | 7940±1630 | | |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + cis-$CH_3CH_2CH$=$CHCH_3$ → $CH_3COOH$ | | | | | | |
| + cy-$(CH_3CH_2)CHCH(CH_3)O$ | | | | | | |
| ETHANEPEROXOIC ACID + cis-2-PENTENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 4.3(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + trans-$CH_3CH_2CH$=$CHCH_3$ → $CH_3COOH$ | | | | | | |
| + cy-$(CH_3CH_2)CHCH(CH_3)O$ | | | | | | |
| ETHANEPEROXOIC ACID + trans-2-PENTENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 4.3(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $CH_3CH_2C(CH_3)$=$CH_2$ → $CH_3COOH$ | | | | | | |
| + cy-$[(CH_3CH_2)C(CH_3)]CH_2O$ | | | | | | |
| ETHANEPEROXOIC ACID + 1-BUTENE, 2-METHYL- | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 6.0(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $(CH_3)_2CHCH$=$CH_2$ → $CH_3COOH$ + cy-$[(CH_3)_2CH]CHCH_2O$ | | | | | | |
| ETHANEPEROXOIC ACID + 1-BUTENE, 3-METHYL- | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 1.0(+1) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $(CH_3)_2C$=$CHCH_3$ → $CH_3COOH$ + cy-$[(CH_3)_2]CCH(CH_3)O$ | | | | | | |
| ETHANEPEROXOIC ACID + 2-BUTENE, 2-METHYL- | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 370-410 | 1.7(+11) | 0 | 7410±290 | 0.5 | 2.1 |
| ---------- | | | | | | |
| $CH_3C(O)OOH$ + $CH_3CH_2CH_2CH_2CH$=$CH_2$ → $CH_3COOH$ | | | | | | |
| + cy-$(CH_3CH_2CH_2)CHCH_2O$ | | | | | | |
| ETHANEPEROXOIC ACID + 1-HEXENE | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 2.1(+1) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| $CH_3CH_2O$. → $CH_3$ + HCHO | | | | | | |
| ETHOXY FREE RADICAL | | | | | | |
| 77 EAT/MIL2 REACTION ORDER: 1 | 435-491 | 1.0(+15) | 0 | 10870 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2O$. → $CH_3CHO$ + H | | | | | | |
| ETHOXY FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 EAT/MIL2 REACTION ORDER: 1<br>NOTE: EVALUATION | 435-491 | 2.5(+14) | 0 | 11780 | | |
| ---------- | | | | | | |
| $CH_3CH_2O. + NO \rightarrow CH_3CHO + HNO$<br>ETHOXY FREE RADICAL + NITROGEN OXIDE (NO)<br>77 EAT/MIL2 REACTION ORDER: 2<br>NOTE: EVALUATION | 435-491 | 6.3(+12) | 0 | 0±500 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $CH_3CH_2O. + NO \rightarrow CH_3CH_2ONO$<br>ETHOXY FREE RADICAL + NITROGEN OXIDE (NO)<br>73 EAT/MCC REACTION ORDER: 2 | 393-473 | 2.0(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 74 EAT/MIL | 393-473 | 2.0(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 77 EAT/MIL2 | 435-491 | 2.0(+13) | 0 | 0±500 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2O. + NO_2 \rightarrow CH_3CHO + HONO$<br>ETHOXY FREE RADICAL + NITROGEN OXIDE ($NO_2$)<br>77 EAT/MIL2 REACTION ORDER: 2<br>NOTE: EVALUATION | 435-491 | 4.0(+12) | 0 | 0 | | |
| ---------- | | | | | | |
| $CH_3CH_2O. + NO_2 \rightarrow CH_3CH_2ONO_2$<br>ETHOXY FREE RADICAL + NITROGEN OXIDE ($NO_2$)<br>77 EAT/MIL2 REACTION ORDER: 2<br>NOTE: EVALUATION | 435-491 | 7.9(+12) | 0 | 0 | | |
| ---------- | | | | | | |
| $CH_3CH_2O. + CH_3CH_3 \rightarrow CH_3CH_2OH + CH_3CH_2.$<br>ETHOXY FREE RADICAL + ETHANE<br>74 MES/POL REACTION ORDER: 2<br>NOTE: $k_{ref}$: $CH_3CH_2O. \rightarrow HCHO + CH_3$<br>$k/k_{ref}$: $7.0 \times 10^{-6} cm^3 mol^{-1}$ | 593 | - | - | - | 0.9 | 1.2 |
| ---------- | | | | | | |
| $.CH_2CH_2OH + HO_2. \rightarrow CH_3CH_2OH + O_2$<br>ETHYL, 2-HYDROXY-, FREE RADICAL + HYDROPEROXYL FREE RADICAL<br>76 MEA/HEI REACTION ORDER: 2 $k/k_{ref}$: 1.2<br>NOTE: $k_{ref}$: $.CH_2CH_2OH + HO_2. \rightarrow HCHO + HCHO + H_2O$ | 298 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2O_2. \rightarrow HCHO + CH_3O.$<br>ETHYLEIOXY FREE RADICAL<br>74 MES/POL REACTION ORDER: 1 $k/k_{ref}$: 13.4<br>NOTE: $k_{ref}$: $CH_3CH_2O_2. \rightarrow CH_3CHO + OH$ | 593 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2OH + O \rightarrow HCHO + CH_2 + H_2O$<br>ETHANOL + OXYGEN ATOM<br>71 AVR/KOL2. REACTION ORDER: 2 | 343-523 | 3.4(+11) | 0 | 1335 | | |
| ---------- | | | | | | |
| $CH_3CH_2OH + O \rightarrow CH_3CHO + H_2O$<br>ETHANOL + OXYGEN ATOM<br>71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 7.5(+11) | 0 | 1485 | | |
| ---------- | | | | | | |
| $CH_3CH_2OH + O \rightarrow .CH_2CH_2OH + CH_3CH_2O. + OH$<br>ETHANOL + OXYGEN ATOM<br>71 AVR/KOL2 REACTION ORDER: 2 | 343-413 | 1.9(+13) | 0 | 2945 | | |
| ---------- | | | | | | |
| $CH_3CH_2OH + H \rightarrow CH_3CH_2. + H_2O$<br>ETHANOL + HYDROGEN ATOM<br>73 ADE/WAG2 REACTION ORDER: 2<br>NOTE: GIVEN WITH CAUTION | 295-700 | 5.9(+11) | 0 | 1736 | | |
| ---------- | | | | | | |
| $CH_3CH_2OH + H \rightarrow CH_3CH(.)OH + H_2$<br>ETHANOL + HYDROGEN ATOM<br>73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 4.4(+12) | 0 | 2300 | | |
| ---------- | | | | | | |
| $CH_3CH_2OH + H \rightarrow$ products<br>ETHANOL + HYDROGEN ATOM<br>73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 4.2(+12) | 0 | 2115±150 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2OH + OH \rightarrow .CH_2CH_2OH + H_2O$<br>ETHANOL + HYDROXYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 1.8(+12) | - | - | 0.9 | 1.1 |
| $(CH_3)_2O \rightarrow CH_3O. + CH_3$ | | | | | | |
| METHANE, OXYBIS- | | | | | | |
| 75 PAC REACTION ORDER: 1 | 782-936 | 1.0(+15) | 0 | 38250±960 | 0.3 | 3.2 |
| 77 ARO/NAE | 1063-1223 | 2.2(+15) | 0 | 38550 | | |
| $(CH_3)_2O + O \rightarrow CH_3OCH_2. + OH$ | | | | | | |
| METHANE, OXYBIS-, + OXYGEN ATOM | | | | | | |
| 72 LEE/MEA REACTION ORDER: 2 | 217-366 | 5.0(+12) | 0 | 1435±100 | 0.8 | 1.2 |
| $(CH_3)_2O + H \rightarrow CH_3OCH_2. + H_2$ | | | | | | |
| METHANE, OXYBIS-, + HYDROGEN ATOM | | | | | | |
| 74 MEA/KIM REACTION ORDER: 2 | 300-404 | 1.3(+13) | 0 | 2360±50 | 0.6 | 1.4 |
| NOTE: FLOW DISCHARGE METHOD WITH MASS SPECTROMETRIC DETECTION. | | | | | | |
| $(CH_3)_2O + D \rightarrow CH_3OCH_2. + DH$ | | | | | | |
| METHANE, OXYBIS-, + DEUTERIUM ATOM | | | | | | |
| 74 MEA/KIM REACTION ORDER: 2 | 198-363 | 4.1(+13) | 0 | 2230±50 | 0.8 | 1.2 |
| NOTE: FLOW DISCHARGE METHOD WITH ESR DETECTION. | | | | | | |
| k GIVEN WITH CAUTION | | | | | | |
| $CH_3OCH_3 + OH \rightarrow .CH_2OCH_3 + H_2O$ | | | | | | |
| METHANE, OXYBIS-, + HYDROXYL FREE RADICAL | | | | | | |
| 77 PER/ATKI REACTION ORDER: 2 | 299-427 | 7.8(+12) | 0 | 390±150 | | |
| $(CH_3)_2O + CH_3 \rightarrow .CH_2OCH_3 + CH_4$ | | | | | | |
| METHANE, OXYBIS-, + METHYL FREE RADICAL | | | | | | |
| 75 PAC REACTION ORDER: 2 | 782-936 | 3.2(+13) | 0 | 7600±840 | 0.4 | 2.5 |
| NOTE: CURVID ARRHENIUS PLOT OVER EXTENDED T RANGE 373-936K | | | | | | |
| $CH_3OOCH_3 \rightarrow CH_3O. + CH_3O$ | | | | | | |
| PEROXIDE, DIMETHYL- | | | | | | |
| 76 BAT/MCCI REACTION ORDER: 1 | 383-413 | 3.2(+15) | 0 | 18600±100 | 0.3 | 3.2 |
| 73 LIS/MAS | 400 | 3.3(-4) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 77 BAR/BEN | 391-432 | 5.0(+15) | 0 | 18670±450 | 0.3 | 3.2 |
| $CH_3OOCH_3 + CH_3O. \rightarrow CH_3O. + HCHO + CH_3OH$ | | | | | | |
| PEROXIDE, DIMETHYL-, + METHOXY FREE RADICAL | | | | | | |
| 77 BAR/BEN REACTION ORDER: 2 | 391-432 | 5.0(+7) | 0 | 0 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $cy\text{-}CH_2CH_2S \rightarrow CH_2{=}CH_2 + SO$ | | | | | | |
| THIIRANE + OXYGEN ATOM | | | | | | |
| 76 LEE/TIM REACTION ORDER: 2 | 268-424 | 8.1(+12) | 0 | 18±20 | 0.9 | 1.1 |
| $cy\text{-}CH_2SCH_2 + O \rightarrow cy\text{-}CH_2SCH. + OH$ | | | | | | |
| THIIRANE + OXYGEN ATOM | | | | | | |
| 76 LEE REACTION ORDER: 2 | 298-478 | 8.1(+12) | 0 | -18±20 | | |
| $cy\text{-}CH_2CH_2S + H \rightarrow CH_2{=}CH_2 + SH$ | | | | | | |
| THIIRANE + HYDROGEN ATOM | | | | | | |
| 75 YOK/AHM REACTION ORDER: 2 | 300-425 | 5.7(+13) | 0 | 978±88 | 0.9 | 1.1 |
| $cy\text{-}CH_2SCH_2 + H \rightarrow cy\text{-}CH_2SCH. + H_2$ | | | | | | |
| THIIRANE + HYDROGEN ATOM | | | | | | |
| 76 LEE REACTION ORDER: 2 | 298 | 7.1(+11) | - | - | 0.8 | 1.2 |
| $cy\text{-}CH_2CH_2S + S \rightarrow CH_2{=}CH_2 + S_2$ | | | | | | |
| THIIRANE + SULFUR ATOM | | | | | | |
| 71 STK/O'C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 8.3exp(+906/T) | | | | | | |
| $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| 73 KLE/DAVI | 298-355 | 2.7(+13) | 0 | 0 | 0.9 | 1.1 |
| $cy\text{-}CH_2CH_2S + CH_3 \rightarrow CH_2{=}CH_2 + CH_3S.$ | | | | | | |
| THIIRANE + METHYL FREE RADICAL | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 304-478 | 7.1(+10) | 0 | 3370±400 | 0.3 | 3.3 |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $cy\text{-}CH_2CH_2S + CD_3 \rightarrow CH_2{=}CH_2 + CD_3S.$<br>THIIRANE + METHYL-$d_3$ FREE RADICAL<br>72 JAK/AHM REACTION ORDER: 2<br>NOTE: EVALUATION | 303-477 | 5.9(+10) | 0 | 3270±500 | 0.2 | 4.4 |
| $cy\text{-}CH_2CH_2S + CD_3 \rightarrow cy\text{-}CH_2{=}CH(.)S + CD_3H$<br>THIIRANE + METHYL-$d_3$ FREE RADICAL<br>71 JAK/AHM REACTION ORDER: 2<br>NOTE: EVALUATION | 303-477 | 2.2(+11) | 0 | 4800±500 | 0.3 | 4.0 |
| $cy\text{-}CH_2CH_2S + CH_3S. \rightarrow CH_2{=}CH_2 + CH_3S_2.$<br>THIIRANE + METHYL, MERCAPTO-, FREE RADICAL<br>72 JAK/AHM REACTION ORDER: 2<br>NOTE: APPROXIMATE k | 304-478 | 3.2(+11) | 0 | 4430 | | |
| $CH_3SCH_2. + CH_4 \rightarrow (CH_3)_2S + CH_3.$<br>METHYL, (METHYLTHIO)-, FREE RADICAL + METHANE<br>76 ART/LEE REACTION ORDER: 2<br>NOTE: EVALUATION BASED ON $k^{-1}$ AND THERMODYNAMIC DATA | 393-518 | 6.3(+11) | 0 | 7662 | | |
| $CH_3CH_2SH + O \rightarrow CH_3CH_2. + MS(O). + CH_3CH_2S(O). + H$<br>ETHANETHIOL + OXYGEN ATOM<br>76 SIA/GRA REACTION ORDER: 2 | 300 | 1.7(+12) | - | - | | |
| $(CH_3)_2S + O \rightarrow CH_3S(O). + CH_3$<br>METHANE, THIOBIS-, + OXYGEN ATOM<br>76 LEE/TIM REACTION ORDER: 2<br>76 SIA/GRA | 268-424<br>300 | 8.6(+12)<br>3.8(+13) | 0<br>- | -366±16<br>- | 0.9 | 1.1 |
| $(CH_3)_2S + O \rightarrow$ products<br>METHANE, THIOBIS-, + OXYGEN ATOM<br>74 CAD/WIC REACTION ORDER: 2 | | 3.3(+11) | - | - | | |
| $(CH_3)_2S + H \rightarrow CH_3SCH_2. + H_2$<br>METHANE, THIOBIS-, + HYDROGEN ATOM<br>76 LEE REACTION ORDER: 2 | 300 | 9.0(+10) | - | - | 0.7 | 1.3 |
| $(CH_3)_2S + CH_3. \rightarrow CH_3SCH_2. + CH_4$<br>METHANE, THIOBIS-, + METHYL FREE RADICAL<br>76 ART/LEE REACTION ORDER: 2 | 393-518 | 4.2(+11) | 0 | 4613±82 | 0.8 | 1.2 |
| $CH_3CN + O \rightarrow OCN + CH_3$<br>ACETONITRILE + OXYGEN ATOM<br>77 ECN/TIM REACTION ORDER: 2<br>REACTION ORDER: 2 $k/k_{ref}$: 1.2 | 383-500<br>383 | 4.8(+11)<br>- | 0<br>- | 2400±100<br>- | 0.8<br>0.7 | 1.2<br>1.3 |
| NOTE: $k_{ref}$: $CD_3CN + O \rightarrow OCN + CD_3$<br>$k/k_{ref}$: 1.5 | 423 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $CD_3CN + O \rightarrow OCN + CD_3$ | | | | | | |
| $CH_3C(O)O_2NO_2 \rightarrow CH_3C(O)O_2. + NO_2$<br>PEROXIDE, ACETYL NITRO-<br>77 HEN/KEN REACTION ORDER: 1 | 298-313 | 1.9(+16) | 0 | 13540±450 | 0.5 | 1.8 |
| $NCCN + M \rightarrow CN + CN + M$<br>ETHANE DINITRILE<br>73 FUE/TAB REACTION ORDER: 2 M: Ar | 2200-370 | 6.7(+16) | 0 | 49640±610 | 0.8 | 1.2 |
| $NCCN + CN \rightarrow [.C_3N_3]$<br>ETHANE DINITRILE + CYANOGEN FREE RADICAL<br>72 BUL/COOI REACTION ORDER: 2 | 300-377 | 5.6(+11) | 0 | 1576 | | |
| $CH_3N{=}NCH_3 \rightarrow CH_3. + CH_3. + N_2$<br>DIAZENE, DIMETHYL-<br>75 CAM/MAR REACTION ORDER: 1 | 676-813 | 2.0(+13) | 0 | 22750±500 | 0.5 | 2.0 |
| $CH_3N{=}NCH_3 + CH_3 \rightarrow CH_3N{=}NCH_2. + CH_4$<br>DIAZENE, DIMETHYL + METHYL FREE RADICAL<br>77 SCH/KNO REACTION ORDER: 2<br>NOTE: $k_{ref}$: $CD_3COCOCD_3 + CH_3 \rightarrow CD_3COCOCD_2. + CH_3D$ | 524-565 | - | - | - | 0.5 | 2.0 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $k/k_{ref}$: 1.0exp(+600±300/T) | | | | | | |
| $CH_3N{=}NCH_3 + CD_3 \rightarrow CH_3N{=}NCH_2. + CD_3H$ | | | | | | |
| DIAZENE, DIMETHYL-, + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.5 | 2.0 |
| NOTE: $k_{ref}$: $CD_3COCOCD_3 + CD_3 \rightarrow CD_3COCOCD_2. + CD_4$ | | | | | | |
| $k/k_{ref}$: 0.63exp(+750±300/T) | | | | | | |
| $(CH_3)_2NNH_2 \rightarrow (CH_3)_2N. + NH_2$ | | | | | | |
| HYDRAZINE, 1,1-DIMETHYL- | | | | | | |
| 72 GOL/SOL REACTION ORDER: 1 | 869-1076 | 4.0(+17) | 0 | 31710 | | |
| $CH_3NHNHCH_3 \rightarrow CH_3N{=}NCH_3 + H_2$ | | | | | | |
| HYDRAZINE, 1,2-DIMETHYL- | | | | | | |
| 72 GOL/SOL REACTION ORDER: 1 | 910-1271 | 3.2(+13) | 0 | 28690 | | |
| $CH_3C(O)OONO_2 \rightarrow CH_3C(O)OO. + NO_2$ | | | | | | |
| PEROXIDE, ACETYL NITRO- | | | | | | |
| 77 COX/ROF REACTION ORDER: 1 | 294-328 | 7.9(+14) | 0 | 12500±400 | 0.3 | 4.0 |
| $CH_3C(O)OONO_2 + OH \rightarrow$ products | | | | | | |
| PEROXIDE, ACETYL NITRO-, + HYDROXYL FREE RADICAL | | | | | | |
| 77 WIN/LLO REACTION ORDER: 2 | 299 | ≤1.0(+11) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| $CH_3CH_2NO + CH_3CH_2. \rightarrow (CH_3CH_2)_2NO.$ | | | | | | |
| ETHANE, NITROSO-, + ETHYL FREE RADICAL | | | | | | |
| 72 TAN/LAM REACTION ORDER: 2 | 329 | >1.4(+10) | - | - | | |
| NOTE: LOWER LIMIT k | | | | | | |
| $CH_3CH_2NO + CH_3CH_2NO \rightarrow (CH_3CH_2NO)_2$ | | | | | | |
| ETHANE, NITROSO- | | | | | | |
| 72 TAN/LAM REACTION ORDER: 2 | 314 | 3.0(+4) | - | - | 0.9 | 1.1 |
| $CH_3CH_2ONO \rightarrow CH_3CHO + HNO$ | | | | | | |
| NITROUS ACID ETHYL ESTER | | | | | | |
| 75 BAT/MCC REACTION ORDER: 1 | 393-473 | 6.3(+13) | 0 | 18875 | | |
| 77 BAT/MIL2 | 435-491 | 5.0(+13) | 0 | 18873 | | |
| $CH_3CH_2ONO \rightarrow CH_3CH_2O. + NO$ | | | | | | |
| NITROUS ACID ETHYL ESTER | | | | | | |
| 74 BAT/MIL REACTION ORDER: 1 | 393-473 | 1.0(+16) | 0 | 21040±450 | 0.4 | 2.5 |
| NITROUS ACID ETHYL ESTER | 393-473 | 1.0(+16) | 0 | 21037±450 | 0.4 | 2.5 |
| 75 BAT/MCC | 435-491 | 1.0(+16) | 0 | 21040±450 | 0.4 | 2.5 |
| 77 BAT/MIL2 | | | | | | |
| $CH_3CH_2ONO + O \rightarrow CH_3CHO + OH + NO$ | | | | | | |
| NITROUS ACID ETHYL ESTER + OXYGEN ATOM | | | | | | |
| 75 DAV/THR REACTION ORDER: 2 | 300-410 | 2.6(+13) | 0 | 2440±240 | | |
| $CH_3CH_2ONO + O_3 \rightarrow CH_3CH_2ONO_2 + O_2$ | | | | | | |
| NITROUS ACID ETHYL ESTER + OZONE | | | | | | |
| 76 HAS/FRE REACTION ORDER: 2 | 298-352 | 1.9(+8) | 0 | 2351±116 | 0.7 | 1.4 |
| $CH_3CH_2ONO_2 \rightarrow CH_3CH_2. + NO_2$ | | | | | | |
| NITRIC ACID ETHYL ESTER | | | | | | |
| 77 BAT/MIL2 REACTION ORDER: 1 | 435-491 | 1.0(+16) | 0 | 20130 | | |
| $OC{=}C{=}CO + O \rightarrow CO + CO + CO$ | | | | | | |
| 1,2-PROPADIENE-1,3-DIONE + OXYGEN ATOM | | | | | | |
| 74 PIL/WAG REACTION ORDER: 2 | 250-450 | 1.0(+13) | 0 | 1100±170 | 0.8 | 1.2 |
| $OC{=}C{=}CO + O^*(^1D) \rightarrow CO + CO + CO$ | | | | | | |
| 1,2-PROPADIENE -1,3-DIONE + OXYGEN ATOM | | | | | | |
| 73 BEI/HUS2 REACTION ORDER: 2 | 300 | 2.4(+14) | - | - | 0.9 | 1.1 |
| $OC{=}C{=}CO + H \rightarrow OC{=}CH. + CO$ | | | | | | |
| 1,2-PROPADIENE-1,3-DIONE + HYDROGEN ATOM | | | | | | |
| 77 FAU/WAG1 REACTION ORDER: 2 | 295-480 | 1.7(+13) | 0 | 1480±180 | 0.6 | 1.4 |
| $O{=}C{=}C{=}C{=}O + OH \rightarrow .CH{=}C{=}O + CO_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 1,2-PROPADIENE-1,3-DIONE + HYDROXYL FREE RADICAL<br>77 FAU/WAG2 REACTION ORDER: 2 | 295-480 | 7.0(+12) | 0 | 620±160 | 0.6 | 1.4 |
| OC=C=CO + C($^3$P) → products<br>1,2-PROPADIENE-1,3-DIONE + CARBON ATOM<br>75 BUS/YOU REACTION ORDER: 2 | 300 | 1.1(+14) | - | - | | |
| OC=C=CO + C*($^1S_0$) → products<br>1,2-PROPADIENE-1,3-DIONE + CARBON ATOM<br>74 BUS/KIR REACTOR ORDER: 2 | 300 | 6.0(+13) | - | - | | |
| $CH_3C{\equiv}CH$ + e → cy-[$(CH_3)C{=}CH$]O*<br>1-PROPYNE + OXYGEN ATOM<br>73 BER REACTION ORDER: 2 | 275-360 | 1.6(13) | 0 | 1010 | | |
| $CH_3C{\equiv}CH$ + e → products<br>PROPYNE + OXYGEN ATOM<br>75 AFR/COX REACTION ORDER: 2 | 298-600 | 1.4(+13) | 0 | 980±350 | 0.7 | 1.3 |
| $CH_3C{\equiv}CH$ + $e_3$ → products<br>1-PROPYNE + OZONE<br>71 DEM REACTION ORDER: 2 | 294 | 1.3(+4) | - | - | 0.5 | 1.5 |
| $CH_3C{\equiv}CH$ + H → $CH_3C(.){=}CH_2$*<br>PROPYNE + HYDROGEN ATOM<br>72 WAG/ZEL2 REACTION ORDER: 2 | 195-503 | 6.5(+12) | 0 | 1000±100 | 0.8 | 1.2 |
| $CH_3C{\equiv}CH$ + H → $CH_3CH{=}CH.$*<br>PROPYNE + HYDROGEN ATOM<br>72 WAG/ZEL2 REACTION ORDER: 2 | 195-503 | 5.8(+12) | 0 | 1560±125 | 0.8 | 1.2 |
| $CH_3C{\equiv}CH$ + H → $CH_3CH{=}CH.$ + $CH_3C(.){=}CH_2$<br>PROPYNE + HYDROGEN ATOM<br>76 WHY/PAY REACTION ORDER: 2 | 215-460 | 3.6(+13) | 0 | 1235±50 | 0.8 | 1.2 |
| $CH_3C{\equiv}CH$ + OH → products<br>PROPYNE + HYDROXYL FREE RADICAL<br>73 BEA/HAC REACTION ORDER: 2 | 298 | 5.7(+11) | - | - | 0.8 | 1.2 |
| $CH_3C{\equiv}CH$ + S → cy-$(CH_3)C{=}CHS$<br>1-PROPYNE + SULFUR ATOM<br>71 STF/O'C REACTION ORDER: 2<br>NOTE: $k/k_{ref}$: 6.2 exp(-453/T) $k_{ref}$: $CH_2{=}CH_2$ + S → cy-$CH_2CH_2S$<br>CONVENTIONAL PHOTOLYSIS METHOD | 298-450 | - | - | - | | |
| $CH_3C{\equiv}CH$ + $NO_2$ → [$CH_3C{=}CH.NO_2$]<br>PROPYNE + NITROGEN OXIDE ($NO_2$)<br>73 ASH/THO REACTION ORDER: 2 | 443-493 | 2.3(+8) | 0 | 6425±80 | 0.8 | 1.2 |
| $CH_3C{\equiv}CH$ + $CH{\equiv}C.$ → H + $CH{\equiv}CC{\equiv}CCH_3$<br>1-PROPYNE + ETHYNYL FREE RADICAL<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.2 | 298 | - | - | - | 0.7 | 1.7 |
| NOTE: $CH{\equiv}CBr$ + $CH{\equiv}C.$ → $.C{\equiv}CBr$ + $CH{\equiv}CH$<br>$k/k_{ref}$: 0.043<br>NOTE: $k_{ref}$: $CH{\equiv}CBr$ + $CH{\equiv}C.$ → Br + $CH{\equiv}CC{\equiv}CH$ | 298 | - | - | - | 0.9 | 1.2 |
| $CH_3C{\equiv}CH$ + $CH{\equiv}C.$ → $CH_3$ + $CH{\equiv}CC{\equiv}CH$<br>1-PROPYNE + ETHYNYL FREE RADICAL<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 9.9<br>NOTE: $k_{ref}$: $CH_3C{\equiv}CH$ + $CH{\equiv}C.$ → H + $CH{\equiv}CC{\equiv}CCH_3$ | 298 | - | - | - | 0.9 | 1.1 |
| $CH_3C{\equiv}CH$ + $CH{\equiv}C.$ → $.CH_2C{\equiv}CH$ + $CH{\equiv}CH$<br>1-PROPYNE + ETHYNYL FREE RADICAL<br>73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 25.0<br>NOTE: $k_{ref}$: $CH_3C{\equiv}CH$ + $CH{\equiv}C.$ → H + $CH{\equiv}CC{\equiv}CCH_3$ | 298 | - | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_2{=}C{=}CH_2 + O \rightarrow CH_2{=}CH_2 + CO$ | | | | | | |
| 1,2-PROPADIENE + OXYGEN ATOM | | | | | | |
| 72 HER/WAG REACTION ORDER: 2 | 275-375 | 7.8(+12) | 0 | 805 | 0.7 | 1.3 |
| $CH_2{=}C{=}CH_2 + O \rightarrow cy\text{-}(CH_2{=}C)CH_2O^*$ | | | | | | |
| 1,2-PROPADIENE | | | | | | |
| 73 HER REACTION ORDER: 2 | 275-360 | 7.8(+12) | 0 | 806 | | |
| $CH_2{=}C{=}CH_2 + O \rightarrow$ products | | | | | | |
| 1,2-PROPADIENE + OXYGEN ATOM | | | | | | |
| 74 HAV REACTION ORDER: 2 $k/k_{ref}$: 0.66 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH{=}CH_2 + O \rightarrow$ products | | | | | | |
| $k/k_{ref}$: 0.197 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2 + O \rightarrow$ products | | | | | | |
| 77 ATK/PIT2 | 297-439 | 1.2(+13) | - | 883±100 | 0.9 | 1.1 |
| $CH_2{=}C{=}CH_2 + O_3 \rightarrow [CH_2{=}C{=}CH_2.O_3]$ | | | | | | |
| 1,2-PROPADIENE + OZONE | | | | | | |
| 74 TEB/TOB REACTION ORDER: 2 | 499-598 | 1.0(+9) | 0 | 2770±500 | 0.2 | 5.0 |
| $CH_2{=}C{=}CH_2 + H \rightarrow CH_3C(.){=}CH_2^*$ | | | | | | |
| 1,2-PROPADIENE + HYDROGEN ATOM | | | | | | |
| 72 WAG/ZEL3 REACTION ORDER: 2 | 273-470 | 8.5(+12) | 0 | 1000±100 | 0.8 | 1.2 |
| $CH_2{=}C{=}CH_2 + H \rightarrow .CH_2CH{=}CH_2^*$ | | | | | | |
| 1,2-PROPADIENE + HYDROGEN ATOM | | | | | | |
| 72 WAG/ZEL3 REACTION ORDER: 2 | 273-470 | 4.0(+12) | 0 | 1360±200 | 0.5 | 1.5 |
| $CH_2{=}C{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 1,2-PROPADIENE + HYDROXYL FREE RADICAL | | | | | | |
| 73 BRA/HAC REACTION ORDER: 2 | 298 | 2.7(+12) | - | - | 0.4 | 1.6 |
| $CH_2{=}C{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 1,2-PROPADIENE + HYDROXYL FREE RADICAL | | | | | | |
| 77 ATK/PER3 REACTION ORDER: 2 | 299-424 | 3.4(+12) | 0 | -153±150 | 0.9 | 1.1 |
| $CH_2{=}C{=}CH_2 + CH_3 \rightarrow .CH_2C(CH_3){=}CH_2$ | | | | | | |
| 1,2-PROPADIENE + METHYL FREE RADICAL | | | | | | |
| 73 TSA REACTION ORDER: 2 | 1100 | 1.6(+11) | 0 | 2500 | | |
| $CH_2{=}C{=}CH_2 + M \rightarrow CH_3C{\equiv}CH + M$ | | | | | | |
| 1,2-PROPADIENE | | | | | | |
| 75 BRA/WES REACTION ORDER: 1 M: Ar | 1440-1700 | 3.0(+14) | 0 | 46670±1920 | 0.3 | 3.6 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| $CH_2{=}C{=}CH_2 + M \rightarrow CH_3C{\equiv}CH + M$ | | | | | | |
| 1,2-PROPADIENE | | | | | | |
| 75 LIH/FRE2 REACTION ORDER: 1 M: Ar | 1030-1220 | 1.5(+13) | 0 | 30400±1550 | 0.3 | 4.0 |
| $CH_3CH{=}CH.^* \rightarrow .CH_2CH{=}CH_2^*$ | | | | | | |
| 1-PROPENYL FREE RADICAL | | | | | | |
| 74 IEU/MUR REACTION ORDER: 1 | 402 | 4.1(+7) | - | - | | |
| | 453 | 8.4(+7) | - | - | | |
| $CH_3CH{=}CH_2 \rightarrow$ products | | | | | | |
| PROPENE | | | | | | |
| 74 BAK/NOV REACTION ORDER: 1 | 973-1123 | 2.3(+14) | 0 | 37140±1500 | | |
| $CH_3CH{=}CH_2 + O \rightarrow CH_2 + CH_3CHO$ | | | | | | |
| PROPENE + OXYGEN ATOM | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 361-483 | 5.1(+10) | 0 | 750 | | |
| $CH_3CH{=}CH_2 + O \rightarrow CH_2{=}C{:} + H_2 + HCHO$ | | | | | | |
| PROPENE + OXYGEN ATOM | | | | | | |
| 71 AVR/KOL1 REACTION ORDER: 2 | 361-483 | 5.4(+11) | 0 | 1260 | | |
| $CH_3CH{=}CH_2 + O \rightarrow .CH_2CH{=}CH_2 + OH$ | | | | | | |
| PROPENE + OXYGEN ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 71 AVR/KOL1 REACTION ORDER: 2 | 373-583 | 7.2(+12) | 0 | 2720 | | |
| $CH_3CH{=}CH_2 + O \rightarrow cy\text{-}(CH_3)CHCH_2O$ | | | | | | |
| PROPENE + OXYGEN ATOM | | | | | | |
| 72 KUR1 REACTION ORDER: 2 | 201-424 | 2.5(+12) | 0 | 38±22 | 0.9 | 1.1 |
| 74 FUR/ATK | 298 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 7.6(+12) | 0 | 363±20 | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + O \rightarrow cy\text{-}(CH_3)CHCH_2O^*$ | | | | | | |
| PROPENE + OXYGEN ATOM | | | | | | |
| 73 HER REACTION ORDER: 2 | 275-360 | 4.2(+12) | 0 | 253 | | |
| $CH_3CH{=}CH_2 + O \rightarrow$ products | | | | | | |
| PROPENE + OXYGEN ATOM | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 71 STU/NIK2 | 300 | 2.2(+11) | - | - | 0.9 | 1.1 |
| 72 ATK/CVE | 298-473 | 6.7(+12) | 0 | 520±50 | 0.9 | 1.1 |
| 74 ATK/PIT1 | 300-392 | 2.1(+12) | 0 | 0±150 | | |
| 74 ATK/PIT2 | 300 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 77 ATK/PIT1 | 298-439 | 6.3(+12) | 0 | 260±100 | | |
| 74 MCC $k/k_{ref}$: 0.2 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2 + O \rightarrow$ products | | | | | | |
| $CH_3CH{=}CH_2 + O_3 \rightarrow$ products | | | | | | |
| PROPENE + OZONE | | | | | | |
| 72 COX/PEN REACTION ORDER: 2 | 295 | 7.6(+6) | - | - | | |
| 73 STE/WU | 299 | 7.5(+6) | - | - | 0.9 | 1.1 |
| 74 BEC/SCH | 280-360 | 6.6(+9) | 0 | 1970±100 | | |
| 74 BER/HUI | 235-362 | 3.7(+9) | 0 | 1897±109 | 0.6 | 1.4 |
| 74 JAP/WU | 298 | 7.8(+6) | - | - | | |
| 76 WIL | 298 | 5.8(+6) | - | - | | |
| $CD_3CD{=}CD_2 + O_3 \rightarrow$ products | | | | | | |
| PROPENE-$d_6$ + $O_3$ | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 9.1(+6) | - | - | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + H \rightarrow CH_2{=}CH_2 + CH_3$ | | | | | | |
| PROPENE + HYDROGEN ATOM | | | | | | |
| 72 KAL/KOR REACTION ORDER: 2 | 1073-117[illegible] | 4.5(+12) | - | - | 0.8 | 1.2 |
| $CH_3CH{=}CH_2 + H \rightarrow .CH_2CH{=}CH_2 + H_2$ | | | | | | |
| PROPENE + HYDROGEN ATOM | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.002 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + H \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2.$ | | | | | | |
| $CH_3CH{=}CH_2 + H \rightarrow CH_3CH_2CH_2.^*$ | | | | | | |
| PROPENE + HYDROGEN ATOM | | | | | | |
| 72 WAG/ZEL1 REACTION ORDER: 2 | 195-390 | 4.4(+12) | 0 | 1385±100 | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + H \rightarrow (CH_3)_2CH.^*$ | | | | | | |
| PROPENE + HYDROGEN ATOM | | | | | | |
| 72 WAG/ZEL1 REACTION ORDER: 2 | 195-390 | 5.4(+12) | 0 | 630±50 | 0.9 | 1.1 |
| 74 IAU/DUE $k/k_{ref}$: 1.79 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + H \rightarrow CH_3CH_2^*.$ | | | | | | |
| $CH_3CH{=}CH_2 + H \rightarrow CH_3CH(.)CH_3^* + CH_3CH_2CH_2.^*$ | | | | | | |
| PROPENE + HYDROGEN ATOM | | | | | | |
| 75 MIH/SCH REACTION ORDER: 2 | 295 | 1.0(+12) | - | - | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + D \rightarrow CH_3CHDCH_2.$ | | | | | | |
| PROPENE + DEUTERIUM ATOM | | | | | | |
| 77 YAN REACTION ORDER: 2 $k/k_{ref}$: 0.65 | 1260-13[illegible] | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + D \rightarrow CH_3CH(.)CH_2D$ | | | | | | |
| $CH_3CH{=}C$[illegible] $+ D \rightarrow CH_3CH(.)CH_2D^* + CH_3CHDCH_2.^*$ | | | | | | |
| [illegible]PENE + DEUTERIUM ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 MIH/SCH REACTION ORDER: 2 | 295 | 6.9(+11) | - | - | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + H + M \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + M$ | | | | | | |
| PROPENE + HYDROGEN ATOM | | | | | | |
| 71 CEW/KEI REACTION ORDER: 2 M: He | 298 | 4.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD. k INCREASING TO $4.8 \times 10^{11} cm^3 mol^{-1} s^{-1}$ FROM 1 to 5 torr PRESSURE. | 298 | 5.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD. 10-15 torr PRESSURE. M = Ne, Ar | | | | | | |
| 71 DAB/NIK | 298 | 4.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: 1.0 to 2.4 torr. He PRESSURE. | | | | | | |
| $CH_3CH{=}CH_2 + D + M \rightarrow CH_3CH(.)CH_2D + CH_3CHDCH_2. + M$ | | | | | | |
| PROPENE + DEUTERIUM ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 6.2(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 to 2.2 torr. He PRESSURE. | | | | | | |
| $CH_3CH{=}CH_2 + OH \rightarrow .CH_2CH{=}CH_2 + H_2O$ | | | | | | |
| PROPENE + HYDROXYL FREE RADICAL | | | | | | |
| 73 GOR REACTION ORDER: 2 | 298 | 8.3(+12) | - | - | 0.8 | 1.2 |
| 74 GER/VOL | 298 | 8.1(+12) | - | - | 0.7 | 1.3 |
| $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| PROPENE + HYDROXYL FREE RADICAL | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 1.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 71 MOR/STE | 300 | 1.0(+13) | - | - | 0.7 | 1.3 |
| 73 SIM/HEI1 REACTION ORDER: 2 $k/k_{ref}$: 75.0 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| $k/k_{ref}$: 55.0 | 473 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| 73 SIM/HEI2 | 373-473 | 8.2(+12) | 0 | 50 | | |
| NOTE: EVALUATION | | | | | | |
| 73 BRA/HAC | 298 | 3.0(+12) | - | - | 0.7 | 1.3 |
| 73 STU | 298 | 8.7(+12) | - | - | 0.8 | 1.2 |
| 75 ATK/PIT | 297-425 | 2.5(+12) | 0 | -545±150 | | |
| 75 PAS/CAR | 300 | 3.0(+12) | - | - | 0.8 | 1.2 |
| 75 CEX | 300 | 2.2(+13) | - | - | 0.9 | 1.1 |
| 76 ILE/DAR | 305 | 1.8(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 76 WIN/ILO | 305 | 1.5(+13) | - | - | 0.9 | 1.1 |
| NOTE: EVALUATION | | | | | | |
| $CD_3CD{=}CD_2 + OH \rightarrow$ products | | | | | | |
| PROPENE-$d_6$ + HYDROXYL FREE RADICAL | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 k/kref: 1.1 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 73 STU REACTION ORDER: 2 | 298 | 1.0(+13) | - | - | | |
| $CH_3CH{=}CH_2 + OH + M \rightarrow$ products | | | | | | |
| PROPENE + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 381 | 8.6(+12) | - | - | 0.9 | 1.1 |
| | 416 | 1.2(+13) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR. | | | | | | |
| $CH_3CH{=}CH_2 + S \rightarrow cy\text{-}(CH_3)CHCH_2S$ | | | | | | |
| PROPENE + SULFUR ATOM | | | | | | |
| 71 CEN/VAN REACTION ORDER: 2 | 298 | 6.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/O'C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 1.0 exp(+574/T); $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| 71 KIE/DAV2 | 214-500 | 3.6(+12) | 0 | 190±45 | 0.2 | 5.2 |
| $CH_3CH{=}CH_2 + NO_2 \rightarrow [CH_3CH{=}CH_2.NO_2]$ | | | | | | |
| PROPENE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 75 GRY/ROZ REACTION ORDER: 2 | 293-373 | 2.4(+5) | 0 | 2820 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CH{=}CH_2 + NO_2 \rightarrow$ products<br>PROPENE + NITROGEN OXIDE ($NO_2$)<br>71 JAF — REACTION ORDER: 2 | 298-373 | 3.2(+6) | 0 | 3950 | | |
| $CH_3CH{=}CH_2 + NO_3 \rightarrow$ products<br>PROPENE + NITROGEN OXIDE ($NO_3$)<br>75 JAP/NIK — REACTION ORDER: 2 | 300 | 3.2(+9) | - | - | 0.9 | 1.1 |
| $CD_3CD{=}CD_2 + NO_3 \rightarrow$ products<br>PROPENE-$d_6$ + NITROGEN OXIDE ($NO_3$)<br>75 JAP/NIK — REACTION ORDER: 2 | 300 | 3.6(+9) | - | - | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + NH_2 \rightarrow$ products<br>PROPENE + AMIDOGEN FREE RADICAL<br>76 LES/SOU — REACTION ORDER: 2 | 300-500 | 2.9(+11) | 0 | 2165±200 | | |
| $CH_3CH{=}CH_2 + CH_3C(O)OO. \rightarrow cy\text{-}(CH_3)CHCH_2O + CH_3 + CO_2$<br>PROPENE + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>77 DIA/WAD — REACTION ORDER: 2 | 393 | 6.4(+6) | - | - | 0.9 | 1.1 |
| $CH_3CH{=}CH_2 + CH_3C(O)OOH \rightarrow cy\text{-}(CH_3)CHCH_2O + CH_3COOH$<br>PROPENE + ETHANEPEROXOIC ACID<br>77 DIA/WAD — REACTION ORDER: 2 | 393 | 2.3(0) | - | - | 0.6 | 1.4 |
| $CH_3CH{=}CH_2 + CH_3CH{=}CH_2 \rightarrow .CH_2CH{=}CH_2 + (CH_3)_2CH.$<br>PROPENE<br>73 SIM/BAC — REACTION ORDER: 2 | 743-803 | 2.5(+13) | 0 | 21890 | | |
| $CH_3CH{=}CH_2 + M \rightarrow CH_3 + CH_2{=}CH. + M$<br>PROPENE<br>75 BUR — REACTION ORDER: 2 M: Ar<br>NOTE: CONCENTRATION DEPENDENT k WITH ARRHENIUS EXPRESSION = k/[Ar] | 1160-1700 | 1.0(+13) | 0 | 37250±500 | 0.3 | 3.2 |
| $cy\text{-}CH_2CH_2CH_2 + O \rightarrow cy\text{-}CH_2CH_2CH. + OH$<br>CYCLOPROPANE + OXYGEN ATOM<br>76 LEE — REACTION ORDER: 2 | 298-478 | 3.3(+12) | 0 | 3120±60 | 0.9 | 1.1 |
| $CH_3CH_2CH_2. \rightarrow CH_3 + CH_2{=}CH_2$<br>PROPYL FREE RADICAL<br>75 CAM/MAR — REACTION ORDER: 1 | 676-813 | 1.3(+12) | 0 | 16360±960 | 0.3 | 3.0 |
| $CH_3CH_2CH_2. + O_2 \rightarrow CH_3CH{=}CH_2 + HO_2$<br>PROPYL FREE RADICAL + OXYGEN MOLECULE<br>71 EAK/BAL — REACTION ORDER: 2<br>71 EAL/LAN — REACTION ORDER: 2 | 753<br>723 | 3.8(+10)<br>5.8(+10) | -<br>- | -<br>- | | |
| $CH_3CH_2CH_2. + O_2 \rightarrow CH_3CH_2CHO + OH$<br>PROPYL FREE RADICAL + OXYGEN MOLECULE<br>71 EAK/BAL — REACTION ORDER: 2 | 753 | 1.1(+8) | - | - | | |
| $CH_3CH_2CH_2. + O_2 \rightarrow cy\text{-}(CH_3)CHCH_2O + OH$<br>PROPYL FREE RADICAL + OXYGEN MOLECULE<br>71 EAK/BAL — REACTION ORDER: 2 | 753 | 3.1(+9) | - | - | | |
| $CH_3CH_2CH_2. + NO_2 \rightarrow CH_3CH_2CH_2O. + NO$<br>PROPYL FREE RADICAL + NITROGEN OXIDE ($NO_2$)<br>74 JAF/WAN — REACTION ORDER: 2 $k/k_{ref}$: 2.2<br>NOTE: $k_{ref}$: $CH_3CH_2CH_2. + NO_2 \rightarrow CH_3CH_2CH_2NO_2$ | 298 | - | - | - | | |
| $CH_3CH_2CH_2. + (CH_3)_2CH. \rightarrow CH_3CH{=}CH_2 + CH_3CH_2CH_3$<br>PROPYL FREE RADICAL + ETHYL, 1-METHYL-, FREE RADICAL<br>71 EAL/SUN — REACTION ORDER: 2 $k/k_{ref}$: 0.41<br>NOTE: $k_{ref}$: $CH_3CH_2CH_2. + (CH_3)_2CH. \rightarrow (CH_3)_2CHCH_2CH_2CH_3$ | 298 | - | - | - | | |
| $CH_3CH_2CH_2. + M \rightarrow CH_3 + CH_2{=}CH_2 + M$<br>PROPYL FREE RADICAL<br>7[illegible] P/LAI — REACTION ORDER: 1 | 525-623 | 2.5(+14) | 0 | 16410±250 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: LIMITING HIGH-PRESSURE k. M = $CH_3CH_2CH_3$ REACTION ORDER: 2 | 525-623 | 2.5(+7) | 0 | 8560±250 | | |
| NOTE: LIMITING LOW-PRESSURE k. M = $CH_3CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CH. \rightarrow H + CH_3CH{=}CH_2$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 CAM/MAR REACTION ORDER: 1 | 676-813 | 2.5(+13) | 0 | 20600±1200 | 0.2 | 5.0 |
| ---------- | | | | | | |
| $(CH_3)_2CH. + O_2 \rightarrow CH_3CH{=}CH_2 + HO_2$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 76 BAL/CLE REACTION ORDER: 2 $k/k_{ref}$: 3060. | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + H_2 \rightarrow CH_3CH_2CH_3 + H$ $k/k_{ref}$: 7680. | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + D_2 \rightarrow CH_3CHDCH_3 + D$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CH. + H_2 \rightarrow CH_3CH_2CH_3 + H$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL + HYDROGEN MOLECULE | | | | | | |
| 76 BAL/CLE REACTION ORDER: 2 $k/k_{ref}$: 2.51 | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + D_2 \rightarrow CH_3CHDCH_3 + D$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CH. + CH_3CH_3 \rightarrow CH_3CH_2CH_3 + CH_3CH_2.$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL + ETHANE | | | | | | |
| 74 SZI/MAR REACTION ORDER: 2 | 496-548 | 2.5(+10) | 0 | 6990±400 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $(CH_3)_2CH. + CH_3CH_2CH_2. \rightarrow CH_3CH{=}CH_2 + CH_3CH_2CH_3$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL + PROPYL FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.41 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + CH_3CH_2CH_2. \rightarrow (CH_3)_2CHCH_2CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CH. + (CH_3)_2CH. \rightarrow CH_3CH{=}CH_2 + CH_3CH_2CH_3$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.69 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + (CH_3)_2CH. \rightarrow (CH_3)_2CHCH(CH_3)_2$ | | | | | | |
| 77 MCK/TUR $k/k_{ref}$: 0.5 | 518-573 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + (CH_3)_2CH. \rightarrow (CH_3)_2CHCH(CH_3)_2$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CH. + (CH_3)_2CH. \rightarrow (CH_3)_2CHCH(CH_3)_2$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 72 HIA/BEN1 REACTION ORDER: 2 | 415 | 4.0(+11) | - | - | 0.8 | 1.3 |
| 74 GEL/FIS | 683-808 | 3.2(+12) | 0 | 0 | 0.6 | 1.6 |
| 76 FAK/QUI | 298 | 5.0(+12) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $(CH_3)_2CH. + (CH_3)_2CHCHO \rightarrow CH_3CH_2CH_3 + (CH_3)_2CHC(O).$ $+ (CH_3)_2C(.)CHO$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL + PROPANAL, 2-METHYL- | | | | | | |
| 76 BAL/CLE REACTION ORDER: 2 $k/k_{ref}$: 0.0032 | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2CH. + O_2 \rightarrow CH_3CH{=}CH_2 + HO_2.$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CH. + M \rightarrow H + CH_3CH{=}CH_2 + M$ | | | | | | |
| ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 PAP/LAI REACTION ORDER: 1 | 525-623 | 2.0(+14) | 0 | 19480 | | |
| NOTE: LIMITING HIGH-PRESSURE k. M = $CH_3CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3* \rightarrow CH_3. + CH_3CH_2.$ | | | | | | |
| PROPANE | | | | | | |
| 72 GRO/HAS REACTION ORDER: 1 | 298 | 4.7(+8) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 \rightarrow$ products | | | | | | |
| PROPANE | | | | | | |
| 72 ILL/SZA REACTION ORDER: 1 | 910-1075 | 6.4(+13) | 0 | 31800 | 0.9 | 1.1 |
| 74 EAK/NOV | 973-1123 | 3.5(+12) | 0 | 28740±1000 | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + O \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + OH$ | | | | | | |
| PROPANE + OXYGEN ATOM | | | | | | |
| 75 BAR/BUR REACTION ORDER: 2 | 329 | 3.9(+10) | - | - | 0.8 | 1.2 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + O^*(^1D) \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + OH$ | | | | | | |
| PROPANE + OXYGEN ATOM | | | | | | |
| 76 FIE/HUS REACTION ORDER: 2 | 300 | 5.7(+14) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + O^*(^1D) \rightarrow$ products | | | | | | |
| PROPANE + OXYGEN ATOM | | | | | | |
| 74 NIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.652 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_4C + O^*(^1D) \rightarrow$ products | | | | | | |
| 75 GAU/SNE $k/k_{ref}$: 10.8 | 300 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow O_2^*(^1\Sigma_g^+)$ | | | | | | |
| | 300 | 4.8(+14) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + H \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + H_2$ | | | | | | |
| PROPANE + HYDROGEN ATOM | | | | | | |
| 76 SHE/KAL REACTION ORDER: 2 | 1123 | 3.7(+12) | - | - | | |
| 77 LED/VIL | 295 | 1.5(+8) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + OH \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + H_2O$ | | | | | | |
| PROPANE + HYDROXYL FREE RADICAL | | | | | | |
| 73 GER REACTION ORDER: 2 | 298 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 74 GER/VEL | 298 | 1.3(+12) | - | - | 0.7 | 1.3 |
| 75 BAR/BUR | 329 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 75 OVE/PAR | 295 | 1.2(+12) | - | - | 0.9 | 1.1 |
| 75 BUC/BOO $k/k_{ref}$: 2.18 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3CH_3 + OH \rightarrow CH_3CH_2. + H_2O$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + OH \rightarrow$ products | | | | | | |
| PROPANE + HYDROXYL FREE RADICAL | | | | | | |
| 73 ERA/HAC REACTION ORDER: 2 | 298 | 5.0(+11) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + OH + M \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + H_2O + M$ | | | | | | |
| PROPANE + HYDROXYL FREE RADICAL | | | | | | |
| 75 GER/MULI REACTION ORDER: 2 M: $H_2O$ | 381 | 1.3(+12) | - | - | 0.9 | 1.1 |
| | 416 | 1.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + HO_2 \rightarrow CH_3CH_2CH_2. + H_2O_2$ | | | | | | |
| PROPANE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 EAL/FUL REACTION ORDER: 2 $k/k_{ref}$: 0.03 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HCHO + HO_2 \rightarrow .CHO + H_2O_2$ | | | | | | |
| | 773 | 3.1(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + HO_2 \rightarrow (CH_3)_2CH. + H_2O_2$ | | | | | | |
| PROPANE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 EAL/FUL REACTION ORDER: 2 $k/k_{ref}$: 0.048 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HCHO + HO_2 \rightarrow .CHO + H_2O_2$ | | | | | | |
| | 773 | 4.8(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + HO_2 \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + H_2O_2$ | | | | | | |
| PROPANE + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 EAI/LAN REACTION ORDER: 2 $k/k_{ref}$: 0.088 | 713 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_3 + HCHO \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + NO_2 \rightarrow (CH_3)_2CH. + HONO$ | | | | | | |
| PROPANE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 76 TIT/DAL REACTION ORDER: 2 | 423-498 | 2.4(+11) | 0 | 11375±60 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH_3 + CH \rightarrow$ products | | | | | | |
| PROPANE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 ROS/PER REACTION ORDER: 2 | 298 | 8.2(+13) | - | - | 0.8 | 1.1 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CH_2CH_3 + CH_2^* \rightarrow CH_3CH_2CH_2CH_3$ | | | | | | |
| PROPANE + METHYLENE FREE RADICAL | | | | | | |
| 75 ZAB/CAR REACTION ORDER: 2 $k/k_{ref}$: 16.67 | 298 | - | - | - | | |
| NOTE: $^1CH_2^*(^1A_1)$ STATE. $k_{ref}$: $CH_2^*(^1A_1) + M \rightarrow CH_2(^3B_1) + M$ | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CH_3 + CH_2 \rightarrow CH_3CH_2CH_2CH_3$ | | | | | | |
| PROPANE + METHYLENE FREE RADICAL | | | | | | |
| 73 BAL/CRU REACTION ORDER: 2 | 304 | 2.7(+12) | - | - | | |
| NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.29 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN PROPANE | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CH_3 + CH_2 \rightarrow (CH_3)_3CH$ | | | | | | |
| PROPANE + METHYLENE FREE RADICAL | | | | | | |
| 73 BAL/CRU REACTION ORDER: 2 | 304 | 1.1(+12) | - | - | | |
| NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.29 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN PROPANE | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CH_3 + CH_3 \rightarrow CH_3CH_2CH_2. + (CH_3)_2CH. + CH_4$ | | | | | | |
| PROPANE + METHYL FREE RADICAL | | | | | | |
| 75 CAM/MAR REACTION ORDER: 2 | 676-743 | 2.0(+12) | 0 | 5690±820 | 0.3 | 3.0 |
| --- | | | | | | |
| $CH_3CH_2CH_3 + CH_3 \rightarrow CH_3CH_2CH_2. + (CH_3)_2CH. + CH_4$ | | | | | | |
| PROPANE + METHYL FREE RADICAL | | | | | | |
| 75 CAM/MAR REACTION ORDER: 2 | 743-813 | 5.0(+15) | 0 | 11600±900 | 0.3 | 3.0 |
| --- | | | | | | |
| $CH_3CH_2CH_3 + CH_3 \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + CH_4$ | | | | | | |
| PROPANE + METHYL FREE RADICAL | | | | | | |
| 75 LIF/FRE1 REACTION ORDER: 2 | 1050-1250 | 3.5(+12) | 0 | 5185 | | |
| --- | | | | | | |
| $CH_3CH_2CH_3 + CN \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + HCN$ | | | | | | |
| PROPANE + CYANOGEN FREE RADICAL | | | | | | |
| 72 BUL/COO2 REACTION ORDER: 2 | 300 | 3.2(+13) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $CH_2{=}CHCHO + O \rightarrow$ products | | | | | | |
| 2-PROPENAL + OXYGEN ATOM | | | | | | |
| 72 CAD/LIN REACTION ORDER: 2 | 300-480 | 4.7(+12) | 0 | 1000±150 | 0.7 | 1.3 |
| 75 GAF/ATK1 | 296 | 2.3(+11) | - | - | 0.9 | 1.1 |
| 75 GAF/ATK2 | 296-423 | 1.4(+13) | 0 | 1210±135 | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_3COCHO + O_3 \rightarrow$ products | | | | | | |
| PROPANAL, 2-OXO-, + OZONE | | | | | | |
| 76 PAT/ATK REACTION ORDER: 2 | 297 | 6.6(+2) | - | - | 0.5 | 1.5 |
| --- | | | | | | |
| $CH_3COCHO + CH_3 \rightarrow CH_3C(O). + CO + CH_4$ | | | | | | |
| PROPANAL, 2-OXO-, + METHYL FREE RADICAL | | | | | | |
| 77 KYL/ORC REACTION ORDER: 2 | 353 | 1.4(+11) | 0 | 3330±340 | 0.4 | 2.4 |
| --- | | | | | | |
| $CH_3CH_2C(O). \rightarrow CH_3CH_2. + CO$ | | | | | | |
| PROPYL, 1-OXO-, FREE RADICAL | | | | | | |
| 73 WAT/THO REACTION ORDER: 1 | 238-278 | 5.9(+12) | 0 | 7250 | | |
| --- | | | | | | |
| $CH_2{=}CHCH_2OH + OH + M \rightarrow$ products | | | | | | |
| 2-PROPEN-1-OL + HYDROXYL FREE RADICAL | | | | | | |
| 75 GOR/MUL1 REACTION ORDER: 2 M: $H_2O$ | 440 | 1.6(+13) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CHO + O \rightarrow CH_3CH_2C(O). + OH$ | | | | | | |
| PROPANAL + OXYGEN ATOM | | | | | | |
| 77 SIN/LKW REACTION ORDER: 2 | 298-472 | 7.8(+12) | 0 | 870±33 | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_3CH_2CHO + O \rightarrow$ products | | | | | | |
| PROPANAL + OXYGEN ATOM | | | | | | |
| 72 CAD/LIN REACTION ORDER: 2 | 300-480 | 8.5(+13) | 0 | 1910±250 | 0.7 | 1.3 |
| --- | | | | | | |
| $CH_3CH_2CHO + O_2 \rightarrow CH_3CH_2C(O). + HO_2$ | | | | | | |
| PROPANAL + OXYGEN MOLECULE | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 7.6(+1) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3CH_2CHO + OH \rightarrow CH_3CH_2C(O). + H_2O$ | | | | | | |
| PROPANAL + HYDROXYL FREE RADICAL | | | | | | |
| 71 MCR/NIK2 reaction order; 2 $k/k_{ref}$: 1.8 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CHO + OH \rightarrow CH_3CH_2C(O). + H_2O$ | | | | | | |
| PROPANAL + HYDROXYL FREE RADICAL | | | | | | |
| 72 VCL/GOR REACTION ORDER: 2 | 298 | 2.3(+12) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| $CH_3CH_2CHO + HO_2 \rightarrow CH_3CH_2C(O). + H_2O_2.$ | | | | | | |
| PROPANAL + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 EAL/LAN REACTION ORDER: 2 | 713 | 1.8(+9) | - | - | | |
| ---------- | | | | | | |
| $(CH_3)_2CO + O \rightarrow CH_3COCH_2. + OH$ | | | | | | |
| 2-PROPANONE + OXYGEN ATOM | | | | | | |
| 72 AZA/GYU REACTION ORDER: 2 | 873 | 8.4(+10) | - | - | | |
| 76 LEE | 298-478 | 1.9(+12) | 0 | 2540±100 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $(CH_3)_2CO + O \rightarrow .CH_2COCH_3 + OH$ | | | | | | |
| 2-PROPANONE + OXYGEN ATOM | | | | | | |
| 77 LEE/TIM REACTION ORDER: 2 | 298-478 | 1.9(+12) | 0 | 2540±90 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $(CH_3)_2CO + H \rightarrow CH_3COCH_2. + H_2$ | | | | | | |
| 2-PROPANONE + HYDROGEN ATOM | | | | | | |
| 72 AZA/GYU REACTION ORDER: 2 | 843-928 | 2.3(+14) | 0 | 7000±750 | 0.6 | 1.4 |
| ---------- | | | | | | |
| $(CH_3)_2CO + NO_2 \rightarrow CH_3COCH_2. + HONO$ | | | | | | |
| 2-PROPANONE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 2 | 298-373 | 3.8(+5) | 0 | 3590 | | |
| ---------- | | | | | | |
| $(CH_3)_2CO + CH_3 \rightarrow .CH_2COCH_3 + CH_4$ | | | | | | |
| 2-PROPANONE + METHYL FREE RADICAL | | | | | | |
| 72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $HD + CH_3.$ $H + CH_3D$; $k/k_{ref}$: 2.30exp(+413/T) | | | | | | |
| 72 SHA/WES | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $D_2 + CH_3. \rightarrow D + CH_3D$; $k/k_{ref}$: 0.617exp(+1020/T) | | | | | | |
| 76 ART/LEE | 398-518 | 4.1(+11) | 0 | 4870±55 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CD_3)_2CO + CD_3 \rightarrow .CD_2COCD_3 + CD_4$ | | | | | | |
| 2-PROPANONE-1,1,1,3,3,3-$d_6$ + METHYL $D_3$ FREE RADICAL | | | | | | |
| 72 SHA/WES REACTION ORDER: 2 | 398-718 | - | - | - | | |
| NOTE: $k_{ref}$: $DH + CD_3 \rightarrow D + CD_3H$; $k/k_{ref}$: 1.47exp(-340/T) | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CO + CH_3 \rightarrow (CH_3)_3CO.$ | | | | | | |
| 2-PROPANONE + METHYL FREE RADICAL | | | | | | |
| 71 CAD/TRO REACTION ORDER: 2 | 373-423 | 1.7(+9) | 0 | 6770±900 | 0.1 | 10.0 |
| NOTE: $k_1 = k_{-1}K$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CO + M \rightarrow CH_3 + CH_3C(O). + M$ | | | | | | |
| 2-PROPANONE | | | | | | |
| 75 FEN/SPI REACTION ORDER: 1 M = Ar | 1400-1600 | 2.0(+16) | 0 | 40000±1440 | | |
| 76 SPI/WAG | 1350-1650 | 2.7(+16) | 0 | 41150±1450 | | |
| NOTE: LIMITING HIGH PRESSURE k. | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHOCH_3 + O \rightarrow$ products | | | | | | |
| ETHENE, METHOXY-, + OXYGEN ATOM | | | | | | |
| 77 ATK/PIT2 REACTION ORDER: 2 | 297-439 | 3.8(+12) | 0 | -38±100 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CHOCH_3 + OH \rightarrow$ products | | | | | | |
| ETHENE, METHOXY-, + HYDROXYL FREE RADICAL | | | | | | |
| 77 PER/ATK REACTION ORDER: 2 | 299-427 | 3.7(+12) | 0 | -511±150 | | |
| ---------- | | | | | | |
| $HCOOCH_2CH_3 \rightarrow$ products | | | | | | |
| FORMIC ACID ETHYLESTER | | | | | | |
| 71 BIA/SAN REACTION ORDER: 1 | 830-903 | 2.2(+12) | 0 | 24210±250 | | |
| ---------- | | | | | | |
| $CH_3CH_2COOH + CH_2{=}C{=}O \rightarrow CH_3CH_2C(O)OC(O)CH_3$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| PROPANOIC ACID + ETHENONE<br>76 BLA/VAY REACTION ORDER: 2 | 368-489 | 1.7(+9) | 0 | 6100±90 | 0.8 | 1.2 |
| $CH_3CH_2CH_2O. + NO_2 \rightarrow CH_3CH_2CH_2ONO_2$<br>PROPOXY FREE RADICAL + NITROGEN OXIDE ($NO_2$)<br>75 MEN/GOL REACTION ORDER: 2<br>NOTE: ESTIMATED k | 300 | 3.2(+12) | - | - | | |
| $(CH_3)_2CHO. \rightarrow CH_3CHO + CH_3.$<br>ETHOXY, 1-METHYL-, FREE RADICAL<br>75 BAT/MCC REACTION ORDER: 1 | 393-473 | 2.5(+14) | 0 | 8605 | | |
| $(CH_3)_2CHO. + NO \rightarrow (CH_3)_2CO + HNO$<br>ETHOXY, 1-METHYL-, FREE RADICAL + NITROGEN OXIDE(NO)<br>75 BAT/MCC REACTION ORDER: 2 | 393-473 | 4.0(+12) | 0 | 0±500 | 0.3 | 3.2 |
| $(CH_3)_2CHO. + NO \rightarrow (CH_3)_2CO + HNO$<br>ETHOXY, 1-METHYL-, FREE RADICAL + NITROGEN OXIDE(NO)<br>77 BAT/MIL1 REACTION ORDER: 2<br>NOTE: EVALUATION | 403-433 | 6.3(+12) | 0 | 0±500 | 0.4 | 2.5 |
| $(CH_3)_2CHO. + NO \rightarrow (CH_3)_2CHONO$<br>ETHOXY, 1-METHYL-, FREE RADICAL + NITROGEN OXIDE(NO)<br>74 BAT/MIL REACTION ORDER: 2<br>75 BAT/MCC<br>77 BAT/MIL1<br>NOTE: EVALUATION | 393-473<br>393-473<br>403-433 | 2.5(+13)<br>2.5(+13)<br>3.2(+13) | 0<br>0<br>0 | 0±500<br>0±500<br>0±400 | 0.4<br>0.4<br>0.4 | 2.5<br>2.5<br>2.5 |
| $(CH_3)_2CHO_2. + CH_3O_2. \rightarrow (CH_3)_2CHOH + HCHO + O_2$<br>ETHYLDIOXY, 1-METHYL-, FREE RADICAL<br>+ METHYLDIOXY FREE RADICAL<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 6.2(+11) | - | - | | |
| $(CH_3)_2CHO_2. + (CH_3)_2CHC(O_2.)(CH_3)_2 \rightarrow$ products<br>ETHYLDIOXY, 1-METHYL-, FREE RADICAL<br>+ PROPYLDIOXY,1,1,2-TRIMETHYL-, FREE RADICAL<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 6.2(+11) | - | - | | |
| $CH_3CH_2CH_2OH \rightarrow CH_3CH_2CHO + H_2 + CH_3CH{=}CH_2 + H_2O$<br>1-PROPANOL<br>71 GEN/LEW REACTION ORDER: 1 | 753-833 | 6.8(+5) | 0 | 13270 | | |
| $CH_3CH_2CH_2OH + OH \rightarrow [.C_3H_6OH] + H_2O$<br>1-PROPANOL + HYDROXYL FREE RADICAL<br>76 CAM/MCL REACTION ORDER: 2 | 292 | 2.3(+12) | - | - | 0.9 | 1.1 |
| $(CH_3)_2CHOH \rightarrow CH_3CH{=}CH_2 + H_2O$<br>2-PROPANOL<br>71 TRE REACTION ORDER: 1 | 721-801 | 1.3(+13) | 0 | 24300±1800 | 0.9 | 1.1 |
| $(CH_3)_2CHOH \rightarrow (CH_3)_2CO + H_2$<br>2-PROPANOL<br>71 TRE REACTION ORDER: 1 | 721-801 | 1.0(+14) | 0 | 29040±1000 | 0.9 | 1.1 |
| $(CH_3)_2CHOH \rightarrow (CH_3)_2CO + H_2 + CH_3CH{=}CH_2 + H_2O$<br>2-PROPANOL<br>71 GEN/LEW REACTION ORDER: 1 | 753-833 | 1.1(+5) | 0 | 12580 | | |
| $(CH_3)_2CHOH + OH \rightarrow$ products<br>2-PROPANOL + HYDROXYL FREE RADICAL<br>76 LLO/DAR1 REACTION ORDER: 2<br>NOTE: EVALUATION | 305 | 4.3(+12) | - | - | 0.7 | 1.3 |
| $cy\text{-}(CH_3)CHCH_2S + S \rightarrow CH_3CH{=}CH_2 + S_2$<br>THIIRANE, METHYL-, + SULFUR ATOM<br>71 STR/O'C REACTION ORDER: 2<br>NOTE: $k/k_{ref}$: 8.4 exp(+1057/T); $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$<br>CONVENTIONAL PHOTOLYSIS METHOD | 298-450 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $cy\text{-}(CH_3)CHCH_2S + CH_3 \rightarrow CH_3CH{=}CH_2 + CH_3S.$ | | | | | | |
| THIIRANE, METHYL-, + methyl free radical | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 339-435 | 2.1(+11) | 0 | 3750±830 | 0.1 | 8.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $cy\text{-}(CH_3)CHCH_2S + CH_3 \rightarrow cy\text{-}[(CH_2.)CH{=}CH_2]S + CH_4$ | | | | | | |
| THIIRANE, METHYL-, + methyl free radical | | | | | | |
| 72 JAK/AHM REACTION ORDER: 2 | 339-435 | 1.0(+11) | 0 | 4160±440 | 0.3 | 3.0 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CN \rightarrow CH_2{=}CH_2 + HCN$ | | | | | | |
| PROPANENITRILE | | | | | | |
| 73 LAS/EMO REACTION ORDER: 1 | 803-943 | 1.3(+13) | 0 | 34970±200 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CH_3)_2CHONO \rightarrow (CH_3)_2CO + HNO$ | | | | | | |
| NITROUS ACID 1-METHYLETHYL ESTER | | | | | | |
| 75 BAT/MCC REACTION ORDER: 1 | 393-473 | 1.3(+ 9) | 0 | 13435 | | |
| 77 BAT/MIL1 | 403-433 | 2.5(+9) | 0 | 13600 | | |
| ---------- | | | | | | |
| $(CH_3)_2CHONO \rightarrow (CH_3)_2CHO. + NO$ | | | | | | |
| NITROUS ACID 1-METHYLETHYL ESTER | | | | | | |
| 75 BAT/MCC REACTION ORDER: 1 | 393-473 | 1.6(+16) | 0 | 20635±400 | 0.4 | 2.5 |
| ---------- | | | | | | |
| 74 BAT/MIL | 393-473 | 1.6(+16) | 0 | 20630±400 | 0.4 | 2.5 |
| 77 BAT/MIL1 | 403-433 | 1.6(+16) | 0 | 20635±400 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2ONO_2 \rightarrow CH_3CH_2CH_2O. + NO_2$ | | | | | | |
| NITRIC ACID, PROPYL ESTER | | | | | | |
| 75 MEN/GOL REACTION ORDER: 1 | 300 | 3.2(+16) | 0 | 20130 | | |
| ---------- | | | | | | |
| $CH{=}CC{=}CH + O \rightarrow$ products | | | | | | |
| 1,3-BUTADIYNE + OXYGEN ATOM | | | | | | |
| 73 JON/BAY2 REACTION ORDER: 2 | 296 | 1.6(+12) | - | - | 0.7 | 1.3 |
| 75 HOM/SCH | 297-343 | 8.0(+13) | 0 | 1230 | | |
| ---------- | | | | | | |
| $CH{=}CC{=}CH + H \rightarrow [CH{=}CCH{=}CH. + CH{=}CC(.){=}CH_2]^*$ | | | | | | |
| 1,3-BUTADIYNE + HYDROGEN ATOM | | | | | | |
| 75 SCH/WAR REACTION ORDER: 2 | 298 | 1.3(+12) | - | - | | |
| ---------- | | | | | | |
| $CH{=}CC{=}CH + CH{=}C. \rightarrow H + CH{=}CC{=}CC{=}CH$ | | | | | | |
| 1,3-BUTADIYNE + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 1.67 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH{=}CBr + CH{=}C. \rightarrow .C{=}CBr + CH{=}CH$ | | | | | | |
| ---------- | | | | | | |
| $CH{=}CC{=}CH + CH{=}C. \rightarrow CH{=}CC{=}C. + CH{=}CH$ | | | | | | |
| 1,3-BUTADIYNE + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 1.1 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH{=}CC{=}CH + CH{=}C. \rightarrow H + CH{=}CC{=}CC{=}CH$ | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHC{=}CH + O \rightarrow$ products | | | | | | |
| 1-BUTEN-3-YNE + OXYGEN ATOM | | | | | | |
| 75 HOM/SCH REACTION ORDER: 2 | 295 | 3.0(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_2{=}CHC{=}CH + NO_2 \rightarrow$ products | | | | | | |
| 1-BUTEN-3-YNE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 75 GRY/ROZ REACTION ORDER: 2 | 273-333 | 8.8(+5) | 0 | 1710 | | |
| ---------- | | | | | | |
| $CH_2{=}CHC{=}CH^* + M \rightarrow CH_2{=}CHC{=}CH + M$ | | | | | | |
| 1-BUTEN-3-YNE | | | | | | |
| 75 SCH/WAR REACTION ORDER: 2 M: $H_2$ | 298 | 2.0(+12) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2C{=}CH + O \rightarrow CH_3CH_2CH: + CO$ | | | | | | |
| 1-BUTYNE + OXYGEN ATOM | | | | | | |
| 75 HER/WAG1 REACTION ORDER: 2 | 290-357 | 1.7(+13) | 0 | 400 | | |
| ---------- | | | | | | |
| $CH_3CH_2C{=}CH + O_3 \rightarrow$ products | | | | | | |
| 1-BUTYNE + OZONE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 2.4(+4) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3C{=}CCH_3 + O \rightarrow (CH_3)_2C{:} + CO$ | | | | | | |
| 2-BUTYNE + OXYGEN ATOM | | | | | | |
| 75 BER/WAG2 REACTION ORDER: 2 | 290-360 | 6.0(+13) | 0 | 453 | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| --- | | | | | | |
| $CH_3C{=}CCH_3 + O_3 \rightarrow$ products | | | | | | |
| 2-BUTYNE + OZONE | | | | | | |
| 71 DEM REACTION ORDER: 2 | 294 | 2.0(+4) | - | - | 0.8 | 1.2 |
| --- | | | | | | |
| $CH_3C{=}CCH_3 + S \rightarrow cy\text{-}(CH_3)C{=}C(CH_3)S$ | | | | | | |
| 2-BUTYNE + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 2.7exp(+654/T) | | | | | | |
| $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| $CH_3C{=}CCH_3 + NO_2 \rightarrow [CH_3C{=}CCH_3.NO_2]$ | | | | | | |
| 2-BUTYNE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 73 ASH/THO REACTION ORDER: 2 | 443-493 | 8.1(+8) | 0 | 6030±95 | 0.8 | 1.2 |
| --- | | | | | | |
| $CH_3CH{=}C{=}CH_2 + O \rightarrow$ products | | | | | | |
| 1,2-BUTADIENE + OXYGEN ATOM | | | | | | |
| 74 HAV REACTION ORDER: 2 $k/k_{ref}$: 1.39 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH{=}CH_2 + O \rightarrow$ products | | | | | | |
| REACTION ORDER: 2 $k/k_{ref}$: 0.43 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2 + O \rightarrow$ products | | | | | | |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + O \rightarrow$ products | | | | | | |
| 1,3-BUTADIENE + OXYGEN ATOM | | | | | | |
| 74 MCC REACTION ORDER: 2 $k/k_{ref}$: 0.96 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2 + O \rightarrow$ products | | | | | | |
| 77 ATK/PIT2 REACTION ORDER: 2 | 297-439 | 2.0(+13) | 0 | 53±100 | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + O_3 \rightarrow [CH_2{=}CHCH{=}CH_2.O_3]$ | | | | | | |
| 1,3-BUTADIENE + OZONE | | | | | | |
| 75 TOB/TOB REACTION ORDER: 2 | 273-343 | 6.3(+10) | 0 | 2920±400 | 0.3 | 3.0 |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + O_3 \rightarrow$ products | | | | | | |
| 1,3-BUTADIENE + OZONE | | | | | | |
| 74 BIC/SCH REACTION ORDER: 2 | 280-360 | 3.3(+10) | 0 | 2680±100 | | |
| 74 JAP/WU | 298 | 5.1(+6) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + H + M \rightarrow CH_3CH(.)CH{=}CH_2 + .CH_2CH_2CH{=}CH_2 + M$ | | | | | | |
| 1,3-BUTADIENE + HYDROGEN ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 5.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: 1.3 TORR. He PRESSURE | | | | | | |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + D + M \rightarrow CH_2DCH(.)CH{=}CH_2 + .CH_2CHDCH{=}CH_2 + M$ | | | | | | |
| 1,3-BUTADIENE + DEUTERIUM ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 3.2(+12) | - | - | 0.9 | 1.1 |
| NOTE: 1.6 TO 2.6 TORR. He PRESSURE | | | | | | |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 1,3-BUTADIENE + HYDROXYL FREE RADICAL | | | | | | |
| 76 LIE/DAR REACTION ORDER: 2 | 305 | 4.6(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 77 ATK/PER3 | 299-424 | 8.7(+12) | 0 | -468±150 | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + S \rightarrow cy\text{-}(CH_2{=}C)CHCH_2S$ | | | | | | |
| 1,3-BUTADIENE + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 2.4exp(+1027/T) | | | | | | |
| $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| $CH_2{=}CHCH{=}CH_2 + cis\text{-}NH{=}NH \rightarrow CH_3CH_2CH{=}CH_2 + N_2$ | | | | | | |
| 1,3-BUTADIENE + cis-DIAZENE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.065 | 373 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CH_2$ + cis-NH=NH → $CH_3CH_3$ + $N_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH{=}CH_2$ + $1CH_2{}^*$ → cis-, AND trans-$CH_2{=}CHCH{=}CHCH_3$ + $CH_2{=}C(CH_3)CH{=}CH_2$ | | | | | | |
| 1,3-BUTADIENE + METHYLENE FREE RADICALS | | | | | | |
| 75 CRA/ROS REACTION ORDER: 2 $k/k_{ref}$: 0.14 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_2{=}CHCH{=}CH_2$ + $^1CH_2{}^*$ → cy-$[CH_2{=}CH]CHCH_2CH_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH{=}CH_2$ + $CH_3{\cdot}$ → $CH_2{=}CHCH(CH_3)CH_2{\cdot}$ | | | | | | |
| 1,3-BUTADIENE + METHYL FREE RADICAL | | | | | | |
| 74 CAR/TAR REACTION ORDER: 2 | 298 | - | - | 6050±500 | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH{=}CH_2$ + $CH_3C(O){\cdot}$ → $CH_3COCH_2CH(\cdot)CH{=}CH_2$ | | | | | | |
| 1,3-BUTADIENE + ETHYL, 1-OXO-, FREE RADICAL | | | | | | |
| 73 ENC/LIS REACTION ORDER: 2 | 333-397 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3C(O){\cdot}$ ( + M) → $CH_3{\cdot}$ + CO (+ M) | | | | | | |
| $k/k_{ref}$: $1.6 \times 10^3 \exp(+5280 \pm 500/T)$ | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH{=}CH_2$ + $CH_2{=}CHCH{=}CH_2$ → cy-$(CH{=}CHCH_2CH_2CH{=}CHCH_2CH_2)$, (Z,Z) | | | | | | |
| 1,3-BUTADIENE | | | | | | |
| 77 HUY/LUY REACTION ORDER: 2 | 464-557 | 4.5(+10) | 0 | 14315±50 | 0.9 | 1.1 |
| NOTE: (ZZ) IS NOTATION FOR cis, cis-1,5-CYCLOCTADIENE | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH{=}CH_2$ + $CH_2{=}CHCH{=}CH_2$ → cy-$[CH{=}CHCH_2CH(CH{=}CH_2)CH_2CH_2]$ | | | | | | |
| 1,3-BUTADIENE | | | | | | |
| 77 HUY/LUY REACTION ORDER: 2 | 464-557 | 8.9(+9) | 0 | 12345±60 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH{=}CH{\cdot}^*$ → $\cdot CH_2CH_2CH{=}CH_2{}^*$ | | | | | | |
| 1-BUTENYL FREE RADICAL | | | | | | |
| 76 IBU/TSU REACTION ORDER: 1 | 348<br>396 | 1.0(+9)<br>1.1(+9) | -<br>- | -<br>- | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_2{\cdot}$[=trans-$CH_3CH(\cdot)CH{=}CH_2$] → cis-$CH_3CH{=}CHCH_2{\cdot}$[=cis-$CH_3CH(\cdot)CH{=}CH_2$] | | | | | | |
| trans-2-BUTENYL[=trans-2-PROPYL, 1-METHYL-] FREE RADICAL | | | | | | |
| 72 GER/WAL REACTION ORDER: 1 | 363 | 5.00(+4) | - | - | | |
| NOTE: EVALUATION (TENTATIVE VALUE) | | | | | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH_2CH_2{\cdot}^*$ → $CH_3CH(\cdot)CH{=}CH_2{}^*$ | | | | | | |
| 3-BUTENYL FREE RADICAL | | | | | | |
| 76 IBU/TSU REACTION ORDER: 1 | 348<br>396 | 3.5(+7)<br>6.2(+7) | -<br>- | -<br>- | | |
| ---------- | | | | | | |
| $CH_2{=}CHCH_2CH_2{\cdot}$ + $CH_3CH_2{\cdot}$ → $CH_2{=}CHCH_2CH_3$ + $CH_2{=}CHCH{=}CH_2$ + $CH_2{=}CH_2$ + $CH_3CH_3$ | | | | | | |
| 3-BUTENYL FREE RADICAL + ETHYL FREE RADICAL | | | | | | |
| 75 SIE/RAB REACTION ORDER: 2 $k/k_{ref}$: 0.30 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CH_2{=}CHCH_2CH_2{\cdot}$ + $CH_3CH_2{\cdot}$ → $CH_2{=}CHCH_2CH_2CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH(\cdot)CH{=}CH_2{\cdot}$[=trans-$CH_3CH{=}CHCH_2{\cdot}$] → cis-$CH_3CH(\cdot)CH{=}CH_2{\cdot}$[=cis-$CH_3CH{=}CHCH_2{\cdot}$] | | | | | | |
| trans-2 PROPENYL, 1-METHYL-, [trans-2-BUTENYL] FREE RADICAL | | | | | | |
| 72 GER/WAL REACTION ORDER: 1 | 363 | 5.0(+4) | - | - | | |
| NOTE: EVALUATION (TENTATIVE VALUE) | | | | | | |
| ---------- | | | | | | |
| $\cdot CH_2C(CH_3){=}CH_2$ → $CH_2{=}C{=}CH_2$ + $CH_3{\cdot}$ | | | | | | |
| 2-PROPENYL, 2-METHYL-, FREE RADICAL | | | | | | |
| 73 TSA REACTION ORDER: 1 | 1050 | 2.0(+13) | 0 | 25200 | | |
| ---------- | | | | | | |
| $\cdot CH_2C(CH_3){=}CH_2$ + $CH_3{\cdot}$ → $CH_3CH_2C(CH_3){=}CH_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 2-PROPENYL, 2-METHYL-, FREE RADICAL + METHYL FREE RADICAL | | | | | | |
| 73 TSA REACTION ORDER: 2 | 1020 | 2.0(+13) | - | - | | |
| ---------- | | | | | | |
| $.CH_2C(CH_3)=CH_2 + .CH_2C(CH_3)=CH_2 \rightarrow CH_2=C(CH_3)CH_2CH_2C(CH_3)=CH_2$ | | | | | | |
| 2-PROPENYL, 2-METHYL-, FREE RADICAL | | | | | | |
| 73 EAY/BRO REACTION ORDER: 2 | 295 | 2.6(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 \rightarrow$ products | | | | | | |
| 1-BUTENE | | | | | | |
| 73 SHI/KIN2 REACTION ORDER: 1 | 829-1040 | 1.3(+13) | 0 | 29695 | | |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + O \rightarrow [C_4H_7.] + OH$ | | | | | | |
| 1-BUTENE + OXYGEN ATOM | | | | | | |
| 72 HUI/HER2 REACTION ORDER: 2 | 190-491 | 9.6(+12) | 0 | 990±215 | 0.4 | 1.6 |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + O \rightarrow cy\text{-}(CH_3CH_2)CHCH_2O$ | | | | | | |
| 1-BUTENE + OXYGEN ATOM | | | | | | |
| 72 HUI/HER2 REACTION ORDER: 2 | 190-491 | 2.2(+12) | 0 | 25±105 | 0.5 | 1.5 |
| 74 FUR/ATK | 298 | 2.4(+12) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 7.2(+12) | 0 | 332±23 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + O \rightarrow$ products | | | | | | |
| 1-BUTENE + OXYGEN ATOM | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 1.6(+12) | - | - | 0.9 | 1.1 |
| 71 HUI/HER | 259-493 | 8.8(+12) | 0 | 382±30 | 0.9 | 1.1 |
| 72 ATK/CVE | 298-473 | 6.1(+12) | 0 | 410±50 | 0.9 | 1.1 |
| 74 HAU $k/k_{ref}$: 0.23 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C=CH_2 + O \rightarrow$ products | | | | | | |
| 74 MCC $k/k_{ref}$: 0.18 | 298 | - | - | - | 0.6 | 1.4 |
| NOTE: $k_{ref}$: $(CH_3)_2C=CH_2 + O \rightarrow$ products | | | | | | |
| 77 ATK/PIT1 | 298-439 | 8.4(+12) | 0 | -335±100 | | |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + O_3 \rightarrow$ products | | | | | | |
| 1-BUTENE + OZONE | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 7.5(+6) | - | - | 0.9 | 1.1 |
| 75 HUI/HER | 225-363 | 1.8(+9) | 0 | 1686±20 | 0.9 | 1.1 |
| NOTE: IN 0.0075 TORR. OF $O_2$ AS SCAVENGER | | | | | | |
| 76 WIL | 298 | 5.6(+6) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + H \rightarrow CH_3CH(.)CH=CH_2 + H_2$ | | | | | | |
| 1-BUTENE + HYDROGEN ATOM | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.016 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH=CH_2 + H \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + H \rightarrow CH_3CH_2CH(.)CH_3$ | | | | | | |
| 1-BUTENE + HYDROGEN ATOM | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH=CH_2 + H \rightarrow CH_3CH_2CH_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + H \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2.$ | | | | | | |
| 1-BUTENE + HYDROGEN ATOM | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 15.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH=CH_2 + H \rightarrow CH_3CH(.)CH=CH_2 + .CH_2CH_2CH=CH_2 + H_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH=CH_2 + H + M \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2. + M$ | | | | | | |
| 1-BUTENE + HYDROGEN ATOM | | | | | | |
| 71 CEW/KEI REACTION ORDER: 2 M: He | 298 | 6.8(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD. (2.9 TORR PRESSURE) | | | | | | |
| NOTE: STEADY STATE PHOTOLYSIS METHOD. 10-15 TORR PRESSURE. (M=Ne, Ar) | 298 | 7.8(+11) | - | - | 0.9 | 1.1 |
| 71 DAB/NIK M: He | 298 | 8.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.4 TO 2.8 TORR. He PRESSURE | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CH_2CH{=}CH_2 + D + M \rightarrow CH_3CH_2CH(.)CH_2D + CH_3CH_2CHDCH_2. + M$ | | | | | | |
| 1-BUTENE + DEUTERIUM ATOM | | | | | | |
| 71 DAD/NIK REACTION ORDER: 2 M: He | 298 | 8.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 TO 2.6 TORR. He PRESSURE | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 1-BUTENE + HYDROXYL FREE RADICAL | | | | | | |
| 71 NOK/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 2.4 | 300 | - | - | - | | |
| NOTE: $k/k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 75 PAS/CAR | 300 | 9.0(+12) | - | - | 0.9 | 1.1 |
| 75 ATK/PIT | 297-425 | 4.6(+12) | 0 | -470±150 | | |
| --- | | | | | | |
| $CH_3CH_2CH{=}CH_2 + S \rightarrow cy\text{-}(CH_3CH_2)CHCH_2S$ | | | | | | |
| 1-BUTENE + SULFUR ATOM | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 9.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/O'C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.75exp(+866/T) | | | | | | |
| $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTAIONAL PHOTOLYSIS METHOD | | | | | | |
| 73 KLE/DAV2 | 216-475 | 4.5(+12) | 0 | 180±45 | 0.1 | 14.0 |
| --- | | | | | | |
| $CH_3CH_2CH{=}CH_2 + NO_2 \rightarrow$ products | | | | | | |
| 1-BUTENE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 2 | 298-373 | 2.5(+6) | 0 | 3680 | | |
| --- | | | | | | |
| $CH_3CH_2CH{=}CH_2 + NO_3 \rightarrow$ products | | | | | | |
| 1-BUTENE + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 4.7(+9) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_3CH_2CH{=}CH_2 + CH_3C(O)OO. \rightarrow cy\text{-}(CH_3CH_2)CHCH_2O + CH_3. + CO_2$ | | | | | | |
| 1-BUTENE + ETHYL DIOXY, 1-OXO-, FREE RADICAL | | | | | | |
| 74 DIA/WAD REACTION ORDER: 2 | 393 | 3.5(+7) | - | - | | |
| 75 SEL/WAD | 357-410 | 8.7(+10) | 0 | 3480±420 | 0.3 | 3.0 |
| --- | | | | | | |
| $CH_3CH_2CH{=}CH_2 + CH_3C(O)OOH \rightarrow cy\text{-}(CH_3CH_2)CHCH_2O + CH_3COOH$ | | | | | | |
| 1-BUTENE + ETHANEPEROXOIC ACID | | | | | | |
| 75 SEL/WAD REACTION ORDER: 2 | 357-410 | 4.8(+11) | 0 | 9920±1240 | 0.1 | 25.0 |
| --- | | | | | | |
| $CH_3CH{=}CHCH_3 + O_3 \rightarrow$ products | | | | | | |
| 2-BUTENE + OZONE | | | | | | |
| 74 BIC/SCH REACTION ORDER: 2 | 280-360 | 5.7(+9) | 0 | 1150±75 | | |
| NOTE: cis-and trans-2-BUTENE MIXTURE | | | | | | |
| --- | | | | | | |
| $CH_3CH{=}CHCH_3 + H \rightarrow CH_3CH(.)CH_2CH_3$ | | | | | | |
| 2-BUTENE + HYDROGEN ATOM | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 5.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CHCH_3 + H \rightarrow .CH_2CH{=}CHCH_3 + H_2$ | | | | | | |
| --- | | | | | | |
| $CH_3CH{=}CHCH_3 + H \rightarrow CH_3CH_2CH(.)CH_3$ * | | | | | | |
| 2-BUTENE + HYDROGEN ATOM | | | | | | |
| 74 LAU/BUE REACTION ORDER: 2 $k/k_{ref}$: 0.83 | 298 | - | - | - | 0.9 | 1.2 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + H \rightarrow CH_3CH_2.$ * | | | | | | |
| --- | | | | | | |
| cis-$CH_3{=}CHCH_3 \rightarrow CH_2{=}CHCH_2. + CH_3$ | | | | | | |
| cis-2-BUTENE | | | | | | |
| 74 JEF/BAU REACTION ORDER: 1 | 1150-1325 | 1.0(+16) | 0 | 40260 | 0.3 | 4.0 |
| --- | | | | | | |
| cis-$CH_3CH{=}CHCH_3 \rightarrow CH_2{=}CHCH{=}CH_2 + H_2$ | | | | | | |
| cis-2-BUTENE | | | | | | |
| 76 AIF/GOL REACTION ORDER: 1 | 1100-1300 | 1.0(+13) | 0 | 32700±100 | 0.3 | 4.0 |
| 76 MAS/RIC REACTION ORDER: 1 | 480-550 | 1.0(+13) | 0 | 32965±1000 | 0.3 | 3.2 |
| --- | | | | | | |
| cis-$CH_3CH{=}CHCH_3 \rightarrow$ trans-$CH_3CH{=}CHCH_3$ | | | | | | |
| cis-2-BUTENE | | | | | | |
| 76 MAS/RIC REACTION ORDER: 1 | 480-550 | 4.0(+13) | 0 | 31200±500 | 0.5 | 2.0 |
| --- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| cis-$CH_3CH{=}CHCH_3$ + O → cy-$(CH_3)CHCH(CH_3)O$ | | | | | | |
| cis-2-BUTENE + OXYGEN ATOM | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 9.0(+12) | - | - | 0.8 | 1.2 |
| 76 SIN/CVE | 298-480 | 6.7(+12) | 0 | -135±13 | 0.9 | 1.1 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + O → products | | | | | | |
| cis-2-BUTENE + OXYGEN ATOM | | | | | | |
| 73 DAV/HUI REACTION ORDER: 2 | 268-443 | 5.8(+12) | 0 | -161±32 | 0.9 | 1.1 |
| 74 HAU $k/k_{ref}$: 0.95 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2$ + O → products | | | | | | |
| 74 MCC $k/k_{ref}$: 0.79 | 298 | - | - | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2$ + O → products | | | | | | |
| 77 ATK/PIT | 298-439 | 7.3(+12) | 0 | -118±100 | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $O_2^*(^1\Delta_g)$ → $CH_2{=}CHCH(CH_3)OOH$ | | | | | | |
| cis-2-BUTENE + OXYGEN MOLECULE | | | | | | |
| 75 ASH/OGR REACTION ORDER: 2 | 300-500 | 1.3(+11) | 0 | 3255±140 | 0.7 | 1.4 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $O_3$ → products | | | | | | |
| cis-2-BUTENE + OZONE | | | | | | |
| 74 FIN/PIT REACTION ORDER: 2 | 298 | 6.3(+7) | - | - | 0.7 | 1.3 |
| NOTE: IN $O_2$ CARRIER GAS | | | | | | |
| 74 FIN/PIT | 298 | 1.5(+8) | - | - | 0.9 | 1.1 |
| NOTE: IN $N_2$ CARRIER GAS | | | | | | |
| 74 JAP/WU | 298 | 9.7(+7) | - | - | 0.9 | 1.1 |
| 75 HUI/HER | 225-336 | 1.9(+9) | 0 | 956±54 | 0.8 | 1.2 |
| NOTE: IN 0.0075 TORR. OF $O_2$ AS SCAVENGER | | | | | | |
| 76 WIL | 298 | 7.3(+6) | - | - | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + H → $.CH_2CH{=}CHCH_3$ + $H_2$ | | | | | | |
| cis-2-BUTENE + HYDROGEN ATOM | | | | | | |
| 72 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.015 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: cis-$CH_3CH{=}CHCH_3$ + H → $CH_3CH_2CH(.)CH_3$ | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + H + M → $CH_3CH_2CH(.)CH_3$ + M | | | | | | |
| cis-2-BUTENE + HYDROGEN ATOM | | | | | | |
| 71 COW/KEI REACTION ORDER: 2 M: He | 298 | 3.9(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD. 3.2 TORR PRESSURE | | | | | | |
| M: He | 298 | 2.4(+11) | - | - | 0.8 | 1.2 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD 10-15 TORR PRESSURE | | | | | | |
| 71 DAB/NIK M: He | 298 | 4.7(+11) | - | - | 0.9 | 1.1 |
| NOTE: 1.1 TO 2.8 TORR. He PRESSURE | | | | | | |
| M: He | 298 | 4.1(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 TO 2.6 TORR. He PRESSURE | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + OH → products | | | | | | |
| cis-2-BUTENE + HYDROXYL FREE RADICAL | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 3.6 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2$ + OH → products | | | | | | |
| 75 ATK/PIT REACTION ORDER: 2 | 297-425 | 6.3(+12) | 0 | -490±150 | | |
| 76 LIO/DAR | 305 | 3.9(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| 76 WIN/LIO | 305 | 3.7(+13) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + S → cy-$(CH_3)CHCH(CH_3)S$ | | | | | | |
| cis-2-BUTENE + SULFUR ATOM | | | | | | |
| 71 STR/O'C REACTION ORDER: 2 | 298 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.53exp(+1050/T) | | | | | | |
| $k_{ref}$: $CH_2{=}CH_2$ + S → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + S → products | | | | | | |
| cis-2-BUTENE + SULFUR ATOM | | | | | | |
| 73 DAV/KLE REACTION ORDER: 2 | 219-500 | 2.8(+12) | 0 | -116±45 | 0.9 | 1.1 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $SO_2^*(^3B_1)$ → [cis-$CH_3CH{=}CHCH_3.SO_2$]* | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| cis-2-BUTENE + SULFUR DIOXIDE<br>74 DEM/CAL REACTION ORDER: 2 | 294 | 1.3(+14) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $NO_2$ → products<br>cis-2-BUTENE + NITROGEN OXIDE ($NO_2$)<br>71 JAF REACTION ORDER: 2 | 298-373 | 2.5(+5) | 0 | 2740 | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $NO_3$ → products<br>cis-2-BUTENE + NITROGEN OXIDE ($NO_3$)<br>75 JAP/NIK REACTION ORDER: 2 | 300 | 1.1(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + cis-NH=N → $CH_3CH_2CH_2CH_3$ + $N_2$<br>cis-2-BUTENE + cis-DIAZENE<br>74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.11 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2$ + cis-NH=NH → $CH_3CH_3$ + $N_2$ | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ → cis-$CH_3CH(.)CH(CH_3)CH_2CH_2$.<br>cis-2-BUTENE + ETHENE<br>77 SAC/BAC REACTION ORDER: 2 | 663-703 | 1.5(+12) | 0 | 24360 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES FOR Ea AND FOUR k's | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $CH_3C(O)OO.$ → cy-$(CH_3)CHCH(CH_3)O$ + $CH_3.$ + $CO_2$<br>cis-2-BUTENE + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>72 RAY/WAD REACTION ORDER: 2 | 457 | 2.0(+9) | - | - | | |
| NOTE: EVALUATION<br>75 DIA/SEL | 393 | 7.5(+7) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $CH_3C(O)OOH$ → cy-$(CH_3)CHCH(CH_3)O$ + $CH_3COOH$<br>cis-2-BUTENE + ETHANEPEROXOIC ACID<br>75 DIA/SEL REACTION ORDER: 2 | 393 | 3.2(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + M → trans-$CH_3CH{=}CHCH_3$ + M<br>cis-2-BUTENE<br>74 SPR/AKI REACTION ORDER: 2 M: $NO_2$ | 298-366 | 7.2(+10) | 0 | 5940 | | |
| ---------- | | | | | | |
| cis-$CH_3CH{=}CHCH_3$ + $M^*$ → trans-$CH_3CH{=}CHCH_3$ + M<br>cis-2-butene<br>73 COX REACTION ORDER: 2 | 296 | 1.6(+14) | - | - | 0.9 | 1.1 |
| NOTE: $M^*$ is $^3SO_2{}^*$ (59% trans ISOMER FORMED) | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ → $CH_3$ + $CH_2{=}CHCH_2$<br>trans-2-BUTENE<br>74 JEF/BAU REACTION ORDER: 1 | 1150-1325 | 1.0(+16) | 0 | 40260 | 0.3 | 4.0 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + O → products<br>trans-2-BUTENE + OXYGEN ATOM<br>74 MOC REACTION ORDER: 2 $k/k_{ref}$:1.25 298 | | - | | - | 0.7 | 1.3 |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2$ + O → products<br>77 ATK/PITI | 298-439 | 1.4(+13) | 0 | -10±100 | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $O_2{}^*(^1\Delta_g)$ → $CH_2{=}CHCH(CH_3)OOH$<br>trans-2-BUTENE + OXYGEN MOLECULE<br>75 ASH/OGR REACTION ORDER: 2 | 300-500 | 1.6(+11) | 0 | 3665±180 | 0.7 | 1.5 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $O_3$ → products<br>trans-2-BUTENE + OZONE<br>73 STE/WU REACTION ORDER: 2 | 299 | 1.7(+8) | - | - | 0.9 | 1.1 |
| 74 JAP/WU | 298 | 1.6(+8) | - | - | 0.9 | 1.1 |
| 75 HUI/HER | 255-363 | 3.6(+9) | 0 | 1051±43 | 0.9 | 1.2 |
| NOTE: IN 0.0075 TORR. OF $O_2$ AS SCAVENGER<br>76 JAP/WU | 299 | 1.5(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + H → $.CH_2CH{=}CHCH_3$ + $H_2$<br>trans-2-BUTENE + HYDROGEN ATOM<br>[illegible] SAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.00[illegible] | 298 | - | - | - | | |
| NOTE: $k_{ref}$: trans-$CH_3CH{=}CHCH_3$ + H → $CH_3CH_2CH(.)CH_3$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + H + M → $CH_3CH_2CH(.)CH_3$ + M | | | | | | |
| trans-2-BUTENE + HYDROGEN ATOM | | | | | | |
| 71 COW/KEI REACTION ORDER: 2 M: He | 298 | 4.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: DISCHARGE FLOW METHOD. 1.8 TORR PRESSURE | | | | | | |
| NOTE: STEADY STATE PHOTOLYSIS METHOD | 298 | 3.3(+11) | - | - | 0.7 | 1.3 |
| 10-15 TORR PRESSURE (M=Ne,Ar) | | | | | | |
| 71 DAB/NIK | 298 | 5.4(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.4 TO 1.9 TORR He PRESSURE | | | | | | |
| NOTE: 0.7 TO 2.2 TORR He PRESSURE | 298 | 4.7(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + OH → products | | | | | | |
| trans-2-BUTENE + HYDROXYL FREE RADICAL | | | | | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 4.2 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_3CH_2$ + OH → products | | | | | | |
| 75 FAS/CAR REACTION ORDER: 2 | 300 | 7.2(+12) | - | - | 0.2 | 1.8 |
| 75 ATK/PIT | 297-425 | 6.7(+12) | 0 | -550±150 | | |
| 75 COX | 300 | 6.4(+13) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + S → cy-$(CH_3)CHCH(CH_3)S$ | | | | | | |
| trans-2-BUTENE + SULFUR ATOM | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 1.2(+13) | - | - | 0.8 | 1.2 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/O'C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.65exp(+1010/T) | | | | | | |
| $k_{ref}$: $CH_2CH_2$ + S → cy-$CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $SO_2^*(^3B_1)$ → [trans-$CH_3CH{=}CHCH_3$. $SO_2^*$] | | | | | | |
| trans-2-BUTENE + SULFUR DIOXIDE | | | | | | |
| 74 DEM/CAL REACTION ORDER: 2 | 294 | 1.2(+14) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $NO_2$ → products | | | | | | |
| trans-2-BUTENE + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 2 | 298-373 | 1.6(+6) | 0 | 3220 | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $NO_3$ → products | | | | | | |
| trans-2-BUTENE + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 8.4(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + cis-NH=NH → $CH_3CH_2CH_2CH_3$ + $N_2$ | | | | | | |
| trans-2-BUTENE + cis-DIAZENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.33 | 373 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2$ + cis-NH=NH → $CH_3CH_3$ + $N_2$ | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $CH_3$. → .$CH_2CH{=}CHCH_3$ + $CH_4$ | | | | | | |
| trans-2-BUTENE + METHYL FREE RADICAL | | | | | | |
| 73 KIC/MAR REACTION ORDER: 2 $k/k_{ref}$: ≈8.0 | 768 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CHO$ + $CH_3$. → $CH_3C(O)$. + $CH_4$ | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ → trans-$CH_3CH(.)CH(CH_3)CH_2CH_2$. | | | | | | |
| trans-2-BUTENE + ETHENE | | | | | | |
| 77 SCA/BAC REACTION ORDER: 2 | 663-703 | 4.1(+12) | 0 | 24660 | 0.9 | 1.1 |
| NOTE: BASED ON EXPERIMENTAL VALUES FOR Ea AND FOUR k's | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ → trans-$CH_3CH(.)CH(CH_3)CH_2CH_2$. | | | | | | |
| trans-2-BUTENE + ETHENE | | | | | | |
| 77 SCA/BAC REACTION ORDER: 2 $k/k_{ref}$: 1.80 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ → cis-$CH_3CH(.)CH(CH_3)CH_2CH_2$. | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH{=}CHCH_3$ + $CH_3C(O)OO$. → cy-$(CH_3)CHCH(CH_3)O$ + $CH_3$. + $CO_2$ | | | | | | |
| trans-2-BUTENE + ETHYLDIOXY, 1-OXO-, FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 DIA/SEL REACTION ORDER: 2 | 393 | 1.2(+8) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| trans-$CH_3CH=CHCH_3$ + $CH_3C(O)OOH$ → cy-$(CH_3)CHCH(CH_3)O$ + $CH_3COOH$ | | | | | | |
| trans-2-BUTENE + ETHANEPEROXOIC ACID | | | | | | |
| 75 DIA/SEL REACTION ORDER: 2 | 393 | 3.2(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| trans-$CH_3CH=CHCH_3$ + M → cis-$CH_3CH=CHCH_3$ + M | | | | | | |
| trans-2-BUTENE | | | | | | |
| 74 SPR/AKI REACTION ORDER: 2 M: $NO_2$ | 297-370 | 4.5(+10) | 0 | 6140 | | |
| trans-$CH_3CH=CHCH_3$ + $M^*$ → cis-$CH_3CH=CHCH_3$ + M | | | | | | |
| trans-2-BUTENE | | | | | | |
| 73 COX REACTION ORDER: 2 | 296 | 2.4(+14) | - | - | 0.9 | 1.1 |
| NOTE: $M^*$ IS $^3SO_2^*$ (41% cis-ISOMER IS FORMED) | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ → $CH_3$. + $CH_2CH=CH_2$ | | | | | | |
| 1-PROPENE, 2-METHYL- | | | | | | |
| 76 BRA/WES2 REACTION ORDER: 1 | 1055-1325 | 1.8(+18) | 0 | 45100 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ → products | | | | | | |
| 1-PROPENE, 2-METHYL- | | | | | | |
| 74 EAK/NOV REACTION ORDER: 1 | 973-1123 | 1.1(+16) | 0 | 38750±1250 | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ + O → cy-$(CH_3)_2CCH_2O$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + OXYGEN ATOM | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 9.9(+12) | - | - | 0.9 | 1.1 |
| 76 SIN/CVE | 298-480 | 8.7(+12) | 0 | -51+22 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ + O → products | | | | | | |
| PROPENE, 2-METHYL-, + OXYGEN ATOM | | | | | | |
| 71 ATK/CVE REACTION ORDER: 2 | 298 | 6.2(+12) | - | - | 0.8 | 1.2 |
| 72 ATK/CVE | 298-473 | 6.3(+12) | 0 | 0±200 | 0.8 | 1.2 |
| 77 ATK/PITI | 298-439 | 1.1(+13) | 0 | 43+100 | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CHD$ + O → products | | | | | | |
| PROPENE-1-$d_1$, 2-METHYL + OXYGEN ATOM | | | | | | |
| 76 HAV/HUN REACTION ORDER: 2 $k/k_{ref}$: 1.03 | 298-302 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2C=CH_2$ + O → products | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CD_2$ + O → products | | | | | | |
| PROPENE-1,1-$d_2$, 2-METHYL + OXYGEN ATOM | | | | | | |
| 76 HAV/HUN REACTION ORDER: 2 $k/k_{ref}$: 1.05 | 298-302 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_2C=CH_2$ + O → products | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ + $O_3$ → products | | | | | | |
| 1-PROPENE, 2-METHYL-, + OZONE | | | | | | |
| 74 BIC/SCH REACTION ORDER: 2 | 283 | 1.1(+7) | - | - | | |
| 74 FIN/PIT | 298 | 5.4(+6) | - | - | 0.6 | 1.4 |
| NOTE: IN $O_2$ CARRIER GAS | 298 | 3.6(+7) | - | - | 0.8 | 1.2 |
| NOTE: IN $N_2$ CARRIER GAS | | | | | | |
| 74 JAP/WU | 298 | 8.2(+6) | - | - | 0.9 | 1.1 |
| 75 BER/HUI | 225-363 | 1.9(+9) | 0 | 1671+23 | 0.9 | 1.1 |
| NOTE: IN 0.0075 TORR. OF $O_2$ AS SCAVENGER | | | | | | |
| 76 WIL | 298 | 7.4(+6) | - | - | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ + H → $.CH_2C(CH_3)=CH_2$ + $H_2$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + HYDROGEN ATOM | | | | | | |
| 76 BRA/WES2 REACTION ORDER: 2 | 1055-1325 | - | - | - | 0.7 | 1.5 |
| NOTE: $k_{ref}$: $(CH_3)_2C=CH_2$ + H → $(CH_3)_3C$. | | | | | | |
| $k/k_{ref}$: $6.8 \times 10^{-2}\exp(2400/T)$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2C=CH_2$ + H → $(CH_3)_3C$. | | | | | | |
| 1-PROPENE, 2-METHYL-, + HYDROGEN ATOM | | | | | | |
| 76 BRA/WES1 REACTION ORDER: 2 | 1030-1300 | 1.6(+13) | 0 | 760 | 0.5 | 1.9 |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $(CH_3)_2C{=}CH_2 + H + M \rightarrow (CH_3)_3C. + (CH_3)_2CHCH_2. + M$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + HYDROGEN ATOM | | | | | | |
| 71 COW/KEI REACTION ORDER: 2 | 298 | 2.0(+12) | - | - | 0.7 | 1.3 |
| NOTE: STEADY STATE PHOTOLYSIS METHOD | | | | | | |
| 10-15 TORR PRESSURE. (M=Ne,Ar) | | | | | | |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + D + M \rightarrow (CH_3)_2C(.)CH_2D + (CH_3)_2CHDCH_2. + M$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + DEUTERIUM ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 2.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: 1.0 TO 2.2 TORR He PRESSURE | | | | | | |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + H \rightarrow (CH_3)_3C.$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 3.8 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 75 AIK/PIT | 297-425 | 5.5(+12) | 0 | -500±150 | | |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + S \rightarrow$ cy-$[(CH_3)_2]CCH_2S$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + SULFUR ATOM | | | | | | |
| 71 CON/VAN REACTION ORDER: 2 | 298 | 3.6(+13) | - | - | 0.9 | 1.1 |
| NOTE: FLASH PHOTOLYSIS METHOD | | | | | | |
| 71 STR/O'C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.97exp(+1190/T) | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + NO_2 \rightarrow$ products | | | | | | |
| 1-PROPENE, 2-METHYL-, + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 71 JAF REACTION ORDER: 2 | 298-373 | 4.0(+4) | 0 | 2000 | | |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + NO_3 \rightarrow$ products | | | | | | |
| 1-PROPENE, 2-METHYL-, + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 6.6(+10) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + CH_3. \rightarrow .CH_2C(CH_3){=}CH_2 + CH_4$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + METHYL FREE RADICAL | | | | | | |
| 73 KON/MAR REACTION ORDER: 2 | 770-855 | 1.1(+14) | 0 | 8860 | | |
| NOTE: EVALUATION | | | | | | |
| 73 FIC/MAR REACTION ORDER: 2 $k/k_{ref}$: ≈5.0 | 768 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CHO + CH_3. \rightarrow CH_3C(O). + CH_4$ | | | | | | |
| 76 BRA/WES2 | 1055-1325 | 6.8(+13) | 0 | 9860 | 0.6 | 1.6 |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + CH_3C(O)OO. \rightarrow$ cy-$[(CH_3)_2]CCH_2O + CH_3. + CO_2$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + ETHYLDIOXY, 1-OXO-, FREE RADICAL | | | | | | |
| 75 SEL/WAD REACTION ORDER: 2 | 357-410 | 1.9(+11) | 0 | 3010±1410 | 0.7 | 1.4 |
| --- | | | | | | |
| $(CH_3)_2C{=}CH_2 + CH_3C(O)OOH \rightarrow$ cy-$[(CH_3)_2]CCH_2O + CH_3COOH$ | | | | | | |
| 1-PROPENE, 2-METHYL-, + ETHANE PEROXOIC ACID | | | | | | |
| 75 SEL/WAD REACTION ORDER: 2 | 357-410 | 4.3(+10) | 0 | 7940±1630 | 0.1 | 68.0 |
| --- | | | | | | |
| $CH_3CH_2CH_2CH_2. + O_2 \rightarrow CH_3CH_2CH{=}CH_2 + HO_2.$ | | | | | | |
| BUTYL FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 2.8(+11) | - | - | | |
| 75 BAK/BAL2 | 753 | 2.7(+11) | - | - | | |
| --- | | | | | | |
| $CH_3CH_2CH_2CH_2. + O_2 \rightarrow$ cy-$CH_2CH_2CH_2CH_2O + OH$ | | | | | | |
| BUTYL FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BAK/BAL3 REACTION ORDER: 2 | 753 | 2.6(+10) | - | - | | |
| --- | | | | | | |
| $CH_3CH_2CH_2CH_2. + CH_3CH_2CH(.)CH_3 \rightarrow CH_3CH_2CH{=}CH_2 + CH_3CH_2CH_2CH_3$ | | | | | | |
| BUTYL FREE RADICAL + PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 BAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.45 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_2CH_2. + CH_3CH_2CH(.)CH_3 \rightarrow CH_3CH_2CH(CH_3)CH_2CH_2CH_2CH_3$ | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow CH_3CH_2CH{=}CH_2 + HO_2.$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BAK/BAL2 REACTION ORDER: 2 | 753 | 5.1(+10) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow$ cis-$CH_3CH{=}CHCH_3 + HO_2.$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 1.2(+11) | - | - | | |
| 75 BAK/BAL2 | 753 | 4.3(+10) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow$ trans-$CH_3CH{=}CHCH_3 + HO_2.$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 2.1(+11) | - | - | | |
| 75 BAK/BAL2 | 753 | 7.8(+10) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow CH_3CH_2COCH_3 + OH$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 2.3(+9) | - | - | | |
| 75 BAK/BAL3 | 753 | 9.4(+8) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow$ cy-$(CH_3CH_2)CHCH_2O + OH$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BAK/BAL3 REACTION ORDER: 2 | 753 | 1.2(+9) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow$ cis-[cy-$(CH_3)CHCH(CH_3)O$] + OH | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BAK/BAL3 REACTION ORDER: 2 | 753 | 4.8(+9) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + O_2 \rightarrow$ trans-[cy-$(CH_3)CHCH(CH_3)O$] + OH | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 75 BAK/BAL3 REACTION ORDER: 2 | 753 | 1.0(+10) | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2. \rightarrow$ | | | | | | |
| $CH_3CH_2CH{=}CH_2 + CH_3CH_2CH_2CH_3$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL + BUTYL FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.45 | 298 | - | - | - | | |
| NOTE: $k/k_{ref}$: $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2. \rightarrow$ | | | | | | |
| $CH_3CH_2CH(CH_3)CH_2CH_2CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3 \rightarrow$ | | | | | | |
| $CH_3CH_2CH{=}CH_2 + CH_3CH_2CH_2CH_3$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.41 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3 \rightarrow$ | | | | | | |
| $CH_3CH_2CH(CH_3)CH(CH_3)CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3 \rightarrow$ | | | | | | |
| cis-, and trans-$CH_3CH{=}CHCH_3 + CH_3CH_2CH_2CH_3$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.36 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3 \rightarrow$ | | | | | | |
| $CH_3CH_2CH(CH_3)CH(CH_3)CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3 \rightarrow CH_3CH_2CH{=}CH_2$ | | | | | | |
| + cis-, and trans-$CH_3CH{=}CHCH_3 + CH_3CH_2CH_2CH_3$ | | | | | | |
| PROPYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 0.77 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3 \rightarrow$ | | | | | | |
| $CH_3CH_2CH(CH_3)CH(CH_3)CH_2CH_3$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH_2. + O_2 \rightarrow (CH_3)_2C{=}CH_2 + HO_2.$ | | | | | | |
| PROPYL, 2-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 76 BAK/BAL REACTION ORDER: 2 | 753 | 2.3(+10) | - | - | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH_2. + O_2 \rightarrow (CH_3)_2CHCHO + OH$ | | | | | | |
| PROPYL, 2-METHYL-, FREE RADICAL + OXYGEN MOLECULE | | | | | | |
| 71 BAK/BAL REACTION ORDER: 2 | 753 | 2.3(+9) | - | - | | |
| ---------- | | | | | | |
| $(CH_3)_3C. \rightarrow CH_3. + CH_3CH{=}CH_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 76 ERA/WES2 REACTION ORDER: 1 $k/k_{ref}$: 1.8 | 1200 | - | - | - | 0.7 | 1.4 |
| NOTE: $k_{ref}$: $(CH_3)_3C. \rightarrow CH_3CH_2. + CH_2{=}CH_2$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3C. + NO \rightarrow (CH_3)_2C{=}CH_2 + HNO$ | | | | | | |
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 74 CFO/MEN REACTION ORDER: 2 | 600 | ≤3.2(+10) | - | - | | |
| NOTE: UPPER LIMIT k | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3C. + NO \rightarrow (CH_3)_3CNO$ | | | | | | |
| ETHYL, 1,1-DIMEHTYL-, FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 74 CHO/MEN REACTION ORDER: 2 | 600 | 3.5(+12) | - | - | 0.5 | 1.5 |
| ---------- | | | | | | |
| $(CH_3)_3C. + CH_3 \rightarrow (CH_3)_4C$ | | | | | | |
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL + METHYL FREE RADICAL | | | | | | |
| 72 MAR/PUR REACTION ORDER: 2 | 756-845 | 7.9(+12) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3C. + CH_3O. \rightarrow (CH_3)_3COCH_3$ | | | | | | |
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL + METHOXY FREE RADICAL | | | | | | |
| 76 EAT/MCC1 REACTION ORDER: 2 | 383-413 | 5.0(+12) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3C. + (CH_3)_3C. \rightarrow (CH_3)_2C{=}CH_2 + (CH_3)_3CH$ | | | | | | |
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 71 FAL/SUN REACTION ORDER: 2 $k/k_{ref}$: 3.1 | 298 | - | - | - | | |
| 77 MCK/TUR REACTION ORDER: 2 $k/k_{ref}$: 2.6 | 471-573 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_3C. + (CH_3)_3C. \rightarrow (CH_3)_3CC(CH_3)_3$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3C. + (CH_3)_3C. \rightarrow (CH_3)_2C{=}CH_2 + (CH_3)_3CH$ | | | | | | |
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 74 CFO/BEA REACTION ORDER: 2 | 620-690 | 1.5(+12) | 0 | 0 | | |
| NOTE: $k_d/k_r = 3.0$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3C. + (CH_3)_3C. \rightarrow (CH_3)_3CC(CH_3)_3$ | | | | | | |
| ETHYL, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 72 MCM/GOL REACTION ORDER: 2 | 462 | 4.0(+8) | - | - | | |
| 73 BIA/BEN | 373 | 2.5(+8) | - | - | | |
| 74 CHO/BEA | 620-690 | 5.0(+11) | 0 | 0 | 0.5 | 2.0 |
| 75 FAR/QUI | 298 | 1.2(+12) | - | - | 0.8 | 1.2 |
| 76 EAT/MCC1 | 383-413 | 2.5(+11) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| 76 CHO/BEA | 623-692 | 6.3(+11) | 0 | 0 | 0.5 | 2.0 |
| NOTE: NEGLIGIBLE T DEPENDENCE | | | | | | |
| 76 MAR/PUR | 800 | 7.9(+11) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| 76 FAR/QUI | 298 | 2.4(+12) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3^{*} \rightarrow CH_3. + CH_3CH_2. + CH_3CH_2CH_2.$ | | | | | | |
| BUTANE | | | | | | |
| 72 BAS/JOH REACTION ORDER: 1 | 298 | 7.3(+6) | - | - | 0.9 | 1.1 |
| NOTE: 0.35 TORR. | | | | | | |
| | 298 | 2.3(+7) | - | - | 0.9 | 1.1 |
| NOTE: 1.06 TORR. | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2. + CH_3CH_2.$ | | | | | | |
| BUTANE | | | | | | |
| 74 GOL/ALF REACTION ORDER: 1 | 1100-1250 | 2.5(+16) | 0 | 40710 | | |
| NOTE: BEST FIT OF EXPERIMENTAL DATA | | | | | | |
| TO log A = 16.4 FOR EACH C-C FISSION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2. + CH_3CH_2.$ | | | | | | |
| BUTANE | | | | | | |
| 74 HUG/MAR REACTION ORDER: 1 | 895-981 | 2.0(+15) | 0 | 38850±2050 | 0.1 | 7.9 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 \rightarrow$ products | | | | | | |
| BUTANE | | | | | | |
| 72 ILL/SZA REACTION ORDER: 1 | 940-1075 | 2.4(+13) | 0 | 30200 | 0.9 | 1.1 |
| 72 ILL | 913-1063 | 5.8(+12) | 0 | 28430 | | |
| 74 BAK/NOV | 973-1123 | 1.5(+12) | 0 | 26775±800 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + O \rightarrow CH_3CH_2CH_2CH_2\cdot + CH_3CH_2CH(\cdot)CH_3 + OH$ | | | | | | |
| BUTANE + OXYGEN ATOM | | | | | | |
| 71 PAP/ASH REACTION ORDER: 2 | 300-365 | 1.7(+13) | 0 | 2280±120 | 0.7 | 1.4 |
| 77 ATK/PER1 REACTION ORDER: 2 | 298-439 | 1.5(+13) | 0 | 2100±150 | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + O \rightarrow$ products | | | | | | |
| BUTANE + OXYGEN ATOM | | | | | | |
| 74 ATK/PIT2 REACTION ORDER: 2 | 301 | 1.9(+10) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + O^*(1D) \rightarrow$ products | | | | | | |
| BUTANE + OXYGEN ATOM | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.863 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_4C + O^*(1D) \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH(\cdot)CH_3 + CH_3CH_2CH_2CH_2\cdot + H_2$ | | | | | | |
| BUTANE + HYDROGEN ATOM | | | | | | |
| 75 NAM/SHE REACTION ORDER: 2 | 800-850 | 1.6(+13) | - | - | 0.8 | 1.2 |
| 76 YAM/NAM | 980-1050 | 9.6(+11) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + OH \rightarrow CH_3CH_2CH_2CH_2\cdot + H_2O$ | | | | | | |
| BUTANE + HYDROXYL FREE RADICAL | | | | | | |
| 75 CAM/HAN1 REACTION ORDER: 2 $k/k_{ref}$: 14.8 | 292 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CO + OH \rightarrow CO_2 + H$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + OH \rightarrow CH_3CH_2CH(\cdot)CH_3 + CH_3CH_2CH_2CH_2\cdot + H_2O$ | | | | | | |
| BUTANE + HYDROXYL FREE RADICAL | | | | | | |
| 73 STU | 298 | 1.4(+12) | - | - | | |
| 71 MOR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 0.24 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| 76 GEK | 298 | 2.0(+12) | - | - | 0.9 | 1.1 |
| 74 GEK/VOL | 298 | 1.7(+12) | - | - | 0.8 | 1.2 |
| 75 HUC/BOO $k/k_{ref}$: 1.54 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3CH_2CH_3 + OH \rightarrow (CH_3)_2CH\cdot + CH_3CH_2CH_2\cdot + H_2O$ | | | | | | |
| 76 PER/ATK2 | 297-420 | 1.1(+13) | 0 | 560±150 | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + OH + M \rightarrow CH_3CH_2CH(\cdot)CH_3 + CH_3CH_2CH_2CH_2\cdot + H_2O + M$ | | | | | | |
| BUTANE + HYDROXYL FREE RADICAL | | | | | | |
| 75 GEK/MUL1 REACTION ORDER: 2 | 298 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: M=Ar(710 TORR) + $H_2O$(10 TORR) + $C_4H_{10}$(0.54-2.46 TORR) | | | | | | |
| M: $H_2O$ | 381 | 2.5(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | 416 | 3.0(+12) | - | - | 0.9 | 1.1 |
| NOTE: IN AN ATMOSPHERE OF WATER VAPOR | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH \rightarrow$ products | | | | | | |
| BUTANE + METHYLIDYNE FREE RADICAL | | | | | | |
| 71 BOS/PER REACTION ORDER: 2 | 298 | 7.8(+13) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + {}^1CH_2{}^* \rightarrow (CH_3)_2CHCH_2CH_3{}^*$ | | | | | | |
| BUTANE + METHYLENE FREE RADICAL | | | | | | |
| 72 GEO/HAS REACTION ORDER: 2 $k/k_{ref}$: 0.89 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3CH_3 + {}^1CH_2{}^* \rightarrow CH_3CH_2CH_3{}^*$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH_2 \rightarrow CH_3CH_2CH_2CH_2CH_3$ | | | | | | |
| BUTANE + METHYLENE FREE RADICAL | | | | | | |
| 73 HAI/CRU REACTION ORDER: 2 | 304 | 2.6(+12) | - | - | | |
| NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.31 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN BUTANE | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH_2 \rightarrow (CH_3)_2CHCH_2CH_3$ | | | | | | |
| BUTANE + METHYLENE FREE RADICAL | | | | | | |
| 73 HAI/CRU REACTION ORDER: 2 | 304 | 2.3(+12) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.31 EFFICIENCY OF $CH_2$ INSERTION AT SECONDARY OVER PRIMARY CH BONDS IN BUTANE | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH_3. \rightarrow CH_3CH_2CH_2CH_2. + CH_4$ | | | | | | |
| BUTANE + METHYL FREE RADICAL | | | | | | |
| 75 YAM REACTION ORDER: 2 | 980-1060 | 5.0(+11) | 0 | 6845 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH_3. \rightarrow CH_3CH(.)CH_2CH_3 + CH_4$ | | | | | | |
| BUTANE + METHYL FREE RADICAL | | | | | | |
| 75 YAM REACTION ORDER: 2 | 980-1060 | 4.3(+11) | 0 | 5285 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH_3. \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2. + CH_4$ | | | | | | |
| BUTANE + METHYL FREE RADICAL | | | | | | |
| 72 PAC/PUR1 REACTION ORDER: 2 | 869-952 | 2.5(+14) | 0 | 9160±1600 | 0.2 | 6.3 |
| 74 BUG/MAR REACTION ORDER: 2 | 895-981 | 3.2(+13) | 0 | 7430±1800 | 0.1 | 7.9 |
| 75 YAM | 980-1060 | 3.2(+12) | 0 | 5585±1000 | 0.4 | 2.6 |
| 76 YAM/NAM | 980-1060 | 3.2(+12) | 0 | 5590±1000 | 0.4 | 2.6 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_3 + CH_3CH_2. \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH_2CH_2. + CH_3CH_3$ | | | | | | |
| BUTANE + ETHYL FREE RADICAL | | | | | | |
| 71 YAM/NAM REACTION ORDER: 2 | 980-1060 | 3.2(+12) | 0 | 6440±1360 | 0.3 | 3.5 |
| 72 PAC/PUR1 | 869-957 | 3.2(+13) | 0 | 10120+860 | 0.4 | 2.5 |
| 74 BUG/MAR | 895-981 | 7.9(+13) | 0 | 11160+810 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $(CH_3)_3CH \rightarrow (CH_3)_2CH. + CH_3$ | | | | | | |
| PROPANE, 2-METHYL- | | | | | | |
| 73 KEN/MAR REACTION ORDER: 1 | 770-855 | 6.3(+16) | 0 | 41120 | | |
| 74 GEL/AIF | 1100-1280 | 7.9(+16) | 0 | 41670 | | |
| NOTE: BEST FIT OF EXPERIMENTAL DATA TO log A = 16.4 FOR EACH C-C FISSION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3CH \rightarrow$ products | | | | | | |
| PROPANE, 2-METHYL- | | | | | | |
| 72 ILL REACTION ORDER: 1 | 913-1063 | 1.1(+15) | 0 | 33640 | | |
| 76 YAM/TSI | 903-1073 | 5.0(+13) | 0 | 30400 | | |
| ---------- | | | | | | |
| $(CH_3)_3CH + OH \rightarrow (CH_3)_3C. + (CH_3)_2CHCH_2. + H_2O$ | | | | | | |
| PROPANE, 2-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 72 GER/VOL REACTION ORDER: 2 | 298 | 2.1(+12) | - | - | 0.8 | 1.2 |
| 75 BUC/BOO $k/k_{ref}$: 1.28 | 653 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH_3CH_2CH_3 + OH \rightarrow (CH_3)_2CH. + CH_3CH_2CH_2. + H_2O$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3CH + HO_2 \rightarrow (CH_3)_3C. + H_2O_2$ | | | | | | |
| PROPANE, 2-METHYL-, + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 $k/k_{ref}$: 0.155 | 713 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_3CH + HCHO \rightarrow$ products | | | | | | |
| 73 BAL/FUL $k/k_{ref}$: 0.133 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HCHO + HO_2 \rightarrow .CHO + H_2O_2$ | 773 | 1.4(+8) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3CH + HO_2 \rightarrow (CH_3)_2CHCH_2. + H_2O_2$ | | | | | | |
| PROPANE, 2-METHYL + HYDROPEROXYL FREE RADICAL | | | | | | |
| 73 BAL/FUL REACTION ORDER: 2 $k/k_{ref}$: 0.045 | 773 | - | - | - | | |
| NOTE: $k_{ref}$: $HCHO + H_2O \rightarrow .CHO + H_2O$ | 773 | 4.6(+7) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3CH + CH_2 \rightarrow (CH_3)_2CHCH_2CH_3$ | | | | | | |
| PROPANE, 2-METHYL-, + METHYLENE FREE RADICAL | | | | | | |
| 73 BAL/CRU REACTION ORDER: 2 | 304 | 3.9(+12) | - | - | | |
| NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.33 EFFICIENCY OF $CH_2$ INSERTION AT TERTIARY OVER PRIMARY CH BONDS IN 2-METHYLPROPANE | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $(CH_3)_3CH + CH_2 \rightarrow (CH_3)_4C$ | | | | | | |
| PROPANE, 2-METHYL-, + METHYLENE FREE RADICAL | | | | | | |
| 73 BAI/CRU REACTION ORDER: 2 | 304 | 5.9(+11) | - | - | | |
| NOTE: EDITOR'S CALCULATION BASED ON REPORTED 1.33 EFFICIENCY OF $CH_2$ INSERTION AT TERTIARY OVER PRIMARY CH BONDS IN 2-METHYLPROPANE | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CH + CH_3 \rightarrow (CH_3)_3C. + CH_4$ | | | | | | |
| PROPANE, 2-METHYL-, + METHYL FREE RADICAL | | | | | | |
| 73 KON/MAR REACTION ORDER: 2 | 770-855 | 3.2(+12) | 0 | 6490 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CH + CH_3 \rightarrow (CH_3)_2CHCH_2. + CH_4$ | | | | | | |
| PROPANE, 2-METHYL-, + METHYL FREE RADICAL | | | | | | |
| 73 KON/MAR REACTION ORDER: 2 | 770-855 | 1.4(+13) | 0 | 8200 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $CH{\equiv}CCH_2COOH \rightarrow CH_2{=}C{=}CH_2 + CO_2$ | | | | | | |
| 3-BUTYNOIC ACID | | | | | | |
| 76 BIG/WEA1 REACTION ORDER: 1 | 500-648 | 2.2(+11) | 0 | 19105±760 | 0.4 | 2.6 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$ | | | | | | |
| --- | | | | | | |
| $CH{\equiv}CCH_2COOD \rightarrow CHD{=}C{=}CH_2 + CO_2$ | | | | | | |
| 3-BUTYNOIC ACID-d | | | | | | |
| 76 BIG/WEA1 REACTION ORDER: 1 | 630 | 5.1(-3) | - | - | | |
| --- | | | | | | |
| $.CH_2COCOCH_3 \rightarrow CH_2{=}C{=}O + CH_3C(O).$ | | | | | | |
| BUTYL, 2,3-DIOXO-, FREE RADICAL | | | | | | |
| 75 SCH/PLA REACTION ORDER: 1 | 822-905 | 2.0(+15) | 0 | 26700 | | |
| --- | | | | | | |
| $CH_3CH{=}CHCHO + O \rightarrow$ products | | | | | | |
| 2-BUTENAL + OXYGEN ATOM | | | | | | |
| 74 CAD/WIC REACTION ORDER: 2 | | 2.0(+13) | 0 | 1160 | | |
| NOTE: UNSPECIFIED TEMPERATURE RANGE IN THE VICINITY OF 300 K. | | | | | | |
| 75 GAF/ATK1 | 296 | 5.1(+11) | - | - | 0.9 | 1.1 |
| 75 GAF/ATK2 | 296-423 | 1.5(+13) | 0 | 995±65 | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_3COCOCH_3 \rightarrow CH_3C(O). + CH_3C(O).$ | | | | | | |
| 2,3-BUTANEDIONE | | | | | | |
| 73 KNO/SCH REACTION ORDER: 1 | 240-277 | 3.2(+17) | 0 | 34070±2210 | 0.1 | 25.0 |
| 75 SCH/PLA | 822-905 | 6.3(+15) | 0 | 33620±860 | | |
| --- | | | | | | |
| $CH_3COCOCH_3 \rightarrow$ products | | | | | | |
| 2,3-BUTANEDIONE | | | | | | |
| 73 KNO/SCH REACTION ORDER: 1 | 240-277 | 1.6(+17) | 0 | 33920±1160 | 0.2 | 5.0 |
| 75 SCH/PLA | 822-905 | 4.0(+13) | 0 | 28080±2100 | 0.1 | 100 |
| NOTE: OVERALL k | 822-905 | 1.3(+15) | 0 | 31450±2370 | 0.1 | 13.0 |
| NOTE: OVERALL k. (INHIBITED BY TOLUENE) | | | | | | |
| --- | | | | | | |
| $CH_3COCOCH_3 + CH_3 \rightarrow (CH_3)_2CO + CH_3C(O).$ | | | | | | |
| 2,3-BUTANEDIONE + METHYL FREE RADICAL | | | | | | |
| 73 KNO/SCH REACTION ORDER: 2 | 240-277 | 2.5(+10) | 0 | 3220 | | |
| NOTE: EVALUATION | | | | | | |
| 75 SCH/PLA REACTION ORDER: 2 | 822-905 | 1.6(+11) | 0 | 4330 | | |
| --- | | | | | | |
| $CD_3COCOCD_2H + CD_3 \rightarrow CD_3COCD_3 + CD_2HC(O).$ | | | | | | |
| 2,3-BUTANEDIONE-1,1,1,4,4-$d_5$ + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 660-685 | - | - | - | 0.6 | 1.6 |
| NOTE: $k_{ref}$: $CD_3COCOCD_3 + CD_3 \rightarrow CD_3COCD_3 + CD_3C(O).$ | | | | | | |
| $k/k_{ref}$: 0.2 exp(+900±150/T) | | | | | | |
| --- | | | | | | |
| $CD_3COCOCD_3 + CH_3 \rightarrow CD_3COCH_3 + CD_3C(O).$ | | | | | | |
| 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ + METHYL FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.4 | 2.5 |
| NOTE: $k_{ref}$: $CD_3COCOCD_3 + CD_3 \rightarrow CD_3COCD_3 + CD_3C(O).$ | | | | | | |
| $k/k_{ref}$: 0.5 EXP(-600±400/T) | | | | | | |
| --- | | | | | | |
| $CH_3COCOCH_3 + CH_3 \rightarrow CH_3COCOCH_2. + CH_4$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 2,3-BUTANEDIONE + METHYL FREE RADICAL | | | | | | |
| 73 KNO/SCH REACTION ORDER: 2 | 240-277 | 3.2(+11) | 0 | 4180 | | |
| 75 SCH/PLA REACTION ORDER: 2 | 822-905 | 7.9(+11) | 0 | 4730 | | |
| ---------- | | | | | | |
| $CH_3COCOCH_3 + CH_3 \rightarrow CH_3COCOCH_2. + CH_4$ | | | | | | |
| 2,3-BUTANEDIONE + METHYL FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.3 | 3.2 |
| NOTE: $k_{ref}$: $CD_3COCOCD_3 + CH_3 \rightarrow CD_3COCOCD_2. + CH_3D$ | | | | | | |
| $k/k_{ref}$: 3.16exp(+300±430/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3COCOCH_3 + CD_3 \rightarrow CH_3COCOCH_2. + CD_3H$ | | | | | | |
| 2,3-BUTANEDIONE + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.8 | 1.3 |
| NOTE: $k_{ref}$: $CD_3COCOCD_2H + CD_3 \rightarrow CD_3COCOCD_2. + CD_3H$ | | | | | | |
| $k/k_{ref}$: 1.58exp(+900±400/T) | | | | | | |
| ---------- | | | | | | |
| $CD_3COCOCD_3 + CD_3 \rightarrow CD_3COCOCD_2. + CD_4$ | | | | | | |
| 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 660-685 | - | - | - | 0.6 | 1.6 |
| NOTE: $k_{ref}$: $CD_3COCOCD_3 + CD_3 \rightarrow CD_3COCD_3 + CD_3C(O).$ | | | | | | |
| $k/k_{ref}$: 10.0exp(-1360±300/T) | | | | | | |
| ---------- | | | | | | |
| $CD_3COCOCD_3 + CD_3 \rightarrow CD_3COCOCD_2. + CD_4$ | | | | | | |
| 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ + METHYL-$d_3$ FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 660-685 | - | - | - | 0.8 | 1.3 |
| NOTE: $k_{ref}$: $CD_3COCOCD_2H + CD_3 \rightarrow CD_3COCOCD_2. + CD_3H$ | | | | | | |
| $k/k_{ref}$: 4.0exp(-900±100/T) | | | | | | |
| ---------- | | | | | | |
| $CD_3COCOCD_3 + CH_3 \rightarrow CH_3COCOCD_3. + CD_3$ | | | | | | |
| 2,3-BUTANEDIONE-1,1,1,4,4,4-$d_6$ + METHYL FREE RADICAL | | | | | | |
| 77 SCH/KNO REACTION ORDER: 2 | 524-565 | - | - | - | 0.4 | 2.5 |
| NOTE: $k_{ref}$: $CD_3COCOCD_3 + CH_3 \rightarrow CH_3COCD_3 + CD_3C(O).$ | | | | | | |
| $k/k_{ref}$: 3.16exp(-3120±450/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3COCOCH_3 + CH_3CH_2. \rightarrow CH_3C(O). + CH_3CH_2COCH_3$ | | | | | | |
| 2,3-BUTANEDIONE + ETHYL FREE RADICAL | | | | | | |
| 76 SCH/KNO REACTION ORDER: 2 | 525-556 | 4.0(+8) | 0 | 2970±300 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $CH_3COCOCH_3 + CH_3CH_2. \rightarrow CH_3COCOCH_2. + CH_3CH_3$ | | | | | | |
| 2,3-BUTANEDIONE + ETHYL FREE RADICAL | | | | | | |
| 76 SCH/KNO REACTION ORDER: 2 | 525-556 | 4.0(+12) | 0 | 5360±1560 | 0.1 | 19.0 |
| ---------- | | | | | | |
| $CH_3COCOCH_3 + CH_3CH_2. \rightarrow CH_3CH_2COCOCH_3 + CH_3.$ | | | | | | |
| 2,3-BUTANEDIONE + ETHYL FREE RADICAL | | | | | | |
| 76 SCH/KNO REACTION ORDER: 2 | 525-556 | 2.5(+8) | 0 | 3575±300 | 0.5 | 2.0 |
| ---------- | | | | | | |
| $CH_3COCH_2CH_2. \rightarrow CH_3C(O). + CH_2{=}CH_2$ | | | | | | |
| BUTYL, 3-OXO-, FREE RADICAL | | | | | | |
| 75 KNO/SCH REACTION ORDER: 1 | 515-712 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3COCH_2CH_2. + CH_3COCH_2CH_2COCH_3 \rightarrow CH_3COCH_2CH_3$ | | | | | | |
| $+ .CH_2COCH_2CH_2COCH_3 + CH_3COCH(.)CH_2COCH_3$ | | | | | | |
| $k/k_{ref}$: 1.0(2.1±0.4)exp(8150±400/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3OCH_2CH{=}CH_2 \rightarrow HCHO + CH_3CH{=}CH_2$ | | | | | | |
| 1-PROPENE, 3-METHOXY- | | | | | | |
| 77 IEU/TAK REACTION ORDER: 1 | 287 | 1.1(+8) | - | - | | |
| ---------- | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CHO + O \rightarrow CH_3CH_2CH_2C(O). + OH$ | | | | | | |
| BUTANAL + OXYGEN ATOM | | | | | | |
| 74 JAF/WAN REACTION ORDER: 2 | 298 | 1.5(+11) | - | - | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CHO + O \rightarrow CH_3CH_2CH_2C(O). + OH$ | | | | | | |
| BUTANAL + OXYGEN ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 SIN/IRW REACTION ORDER: 2 | 298-472 | 1.0(+13) | 0 | 857±20 | 0.9 | 1.1 |
| $CH_3CH_2CH_2CHO + HO_2 \rightarrow CH_3CH_2CH_2C(O). + H_2O_2$ | | | | | | |
| BUTANAL + HYDROPEROXYL FREE RADICAL | | | | | | |
| 71 BAL/LAN REACTION ORDER: 2 | 713 | 2.4(+9) | - | - | | |
| $CH_3CH_2CH_2CHO + NO_2 \rightarrow CH_3CH_2CH_2C(O). + HONO$ | | | | | | |
| BUTANAL + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 74 JAF/WAN REACTION ORDER: 2 | 295-390 | 2.5(+10) | 0 | 6240 | | |
| $(CH_3)_2CHCHO + O \rightarrow (CH_3)_2CHC(O).$ | | | | | | |
| PROPANAL, 2-METHYL-, + OXYGEN ATOM | | | | | | |
| 77 SIN/IRW REACTION ORDER: 2 | 298-472 | 7.9(+12) | 0 | 727±45 | 0.9 | 1.1 |
| $(CH_3)_2CHCHO + (CH_3)_2CH. \rightarrow (CH_3)_2CHC(O). + (CH_3)_2C(.)CHO + CH_3CH_2CH_3$ | | | | | | |
| PROPANAL, 2-METHYL-, + ETHYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 76 BAL/CIE REACTION ORDER: 2 $k/k_{ref}$: 0.0032 | 713 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O_2 + (CH_3)_2CH. \rightarrow HO_2 + CH_3CH{=}CH_2$ | | | | | | |
| $CH_3COCH_2CH_3 + OH \rightarrow$ products | | | | | | |
| 2-BUTANONE + HYDROXYL FREE RADICAL | | | | | | |
| 76 WIN/LIO REACTION ORDER: 2 | 305 | 2.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| $CD_3COCD_2CH_3 + CH_3. \rightarrow .CD_2COCD_2CH_3 + CD_3COCD(.)CH_3 + CH_3D$ | | | | | | |
| 2-BUTANONE-1,1,1,3,3-D5 + METHYL FREE RADICAL | | | | | | |
| 74 SCH/DRE REACTION ORDER: 2 | 523-563 | 1.3(+11) | 0 | 4505±275 | 0.6 | 1.6 |
| $CH_3CH_2COCH_3 + M \rightarrow CH_3CH_2. + CH_3C(O). + M$ | | | | | | |
| 2-BUTANONE | | | | | | |
| 75 ABU/LIS REACTION ORDER: 1 | 291-346 | 4.3(+14) | 0 | 6400±1080 | 0.1 | 31.0 |
| NOTE; LIMITING HIGH PRESSURE k. M = $CH_3CH_2CH_3$ | | | | | | |
| $cy\text{-}CH_2CH_2CH_2CH_2O + OH \rightarrow$ products | | | | | | |
| FURAN, TETRAHYDRO-, + HYDROXYL FREE RADICAL | | | | | | |
| 77 WIN/LIO REACTION ORDER: 2 | 305 | 8.8(+12) | - | - | 0.8 | 1.2 |
| $CH_3COOCH_2CH_3 \rightarrow CH_3COOH + CH_2{=}CH_2$ | | | | | | |
| ACETIC ACID ETHYL ESTER | | | | | | |
| 75 TAY REACTION ORDER: 1 | 650-700 | 3.2(+12) | 0 | 24055±500 | 0.5 | 2.0 |
| $CH_3COOCH_2CH_3 \rightarrow CH_3COOH + CH_2{=}CH_2$ | | | | | | |
| ACETIC ACID ETHYL ESTER | | | | | | |
| 76 DEB/TAY REACTION ORDER: 1 | 650-700 | 3.2(+12) | 0 | 24010 | | |
| $CH_3CH_2CH_2COOH + CH_2{=}C{=}O \rightarrow CH_3CH_2CH_2C(O)OC(O)CH_3$ | | | | | | |
| BUTANOIC ACID + ETHENONE | | | | | | |
| 76 BLA/VAY REACTION ORDER: 2 | 428 | 1.3(+3) | - | - | | |
| $(CH_3)_2CHCOOH + CH_2{=}C{=}O \rightarrow (CH_3)_2CHC(O)OC(O)CH_3$ | | | | | | |
| PROPANOIC ACID, 2-METHYL-, + ETHENONE | | | | | | |
| 76 BLA/VAY REACTION ORDER: 2 | 428 | 1.6(+3) | - | - | | |
| $CH_3OC(O)OCH_2CH_3 \rightarrow CH_3OH + CO_2 + CH_2{=}CH_2$ | | | | | | |
| CARBONIC ACID ETHYL METHYL ESTER | | | | | | |
| 76 CHO/HUN REACTION ORDER: 1 | 581-667 | 5.2(+11) | 0 | 21890 | | |
| $CH_3CH_2CH(O.)CH_3 \rightarrow CH_3CH_2. + CH_3CHO$ | | | | | | |
| PROPOXY, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 BAT/MCC REACTION ORDER: 1 | 393-473 | 1.0(+16) | 0 | 8805 | | |
| 76 BAT/MCC2 | 403-433 | 6.3(+14) | 0 | 7700 | | |
| $CH_3CH_2C(O.)CH_3 + NO \rightarrow CH_3CH_2COCH_3 + HNO$ | | | | | | |
| PROPOXY, 1-METHYL-, FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 75 BAT/MCC REACTION ORDER: 2 | 393-473 | 4.0(+12) | 0 | 0±500 | 0.3 | 3.2 |
| 76 BAT/MCC2 | 403-433 | 6.3(+12) | 0 | 0±500 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CH_2CH(\cdot)CH_3 + NO \rightarrow CH_3CH_2CH(CH_3)ONO$ | | | | | | |
| PROPOXY, 1-METHYL-, FREE RADICAL + NITROGEN OXIDE (NO) | | | | | | |
| 76 EAT/MCC REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 76 EAT/MCC2 | 403-433 | 2.5(+13) | 0 | 0±400 | 0.4 | 2.5 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CO. \rightarrow (CH_3)_2CO + CH_3$ | | | | | | |
| ETHOXY, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 71 CAL/TRO REACTION ORDER: 1 | 373-423 | 2.3(+13) | 0 | 8445±745 | 0.2 | 6.6 |
| NOTE: LIMITING HIGH PRESSURE k | | | | | | |
| 75 EAT/MCC REACTION ORDER: 1 | 393-473 | 4.0(+15) | 0 | 8605 | | |
| 76 EAT/MIL | 393-433 | 4.0(+15) | 0 | 8600 | 0.7 | 1.3 |
| --- | | | | | | |
| $(CH_3)_3CO. + NO \rightarrow (CH_3)_3CONO$ | | | | | | |
| ETHOXY, 1,1-DIMETHYL-, FREE RADICAL + NITROGEN OXIDE(NO) | | | | | | |
| 74 BAT/MIL REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 75 EAT/MCC REACTION ORDER: 2 | 393-473 | 2.5(+13) | 0 | 0±500 | 0.4 | 2.5 |
| 75 MEN/GOL | 300 | 6.3(+12) | - | - | | |
| NOTE: ESTIMATED k | | | | | | |
| 76 EAT/MIL | 393-433 | 2.5(+13) | 0 | 0±500 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CO. + NO_2 \rightarrow (CH_3)_3CONO_2$ | | | | | | |
| ETHOXY, 1,1-DIMETHYL-, FREE RADICAL + NITROGEN OXIDE ($NO_2$) | | | | | | |
| 76 EAT/MIL REACTION ORDER: 2 | 393-433 | 1.6(+13) | 0 | 0 | | |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CO_2. + CH_3O_2. \rightarrow (CH_3)_3CO. + CH_3O. + O_2$ | | | | | | |
| ETHYLDIOXY, 1,1-DIMETHYL-, FREE RADICAL + METHYLDIOXY FREE RADICAL | | | | | | |
| 75 PAR REACTION ORDER: 2 | 298 | 3.0(+10) | - | - | 0.5 | 1.5 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CO_2. + CH_3O_2. \rightarrow (CH_3)_3COH + HCHO + O_2$ | | | | | | |
| ETHYLDIOXY, 1,1-DIMETHYL-, FREE RADICAL + METHYLDIOXY FREE RADICAL | | | | | | |
| 75 PAR REACTION ORDER: 2 | 298 | 3.0(+10) | - | - | 0.5 | 1.5 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $(CH_3)_3CO_2. + (CH_3)_3CO_2. \rightarrow (CH_3)_3CO. + (CH_3)_3CO. + O_2$ | | | | | | |
| ETHYLDIOXY, 1,1-DIMETHYL-, FREE RADICAL | | | | | | |
| 75 PAR REACTION ORDER: 2 | 298 | 2.2(+6) | - | - | 0.8 | 1.2 |
| NOTE: UNREPORTED T ASSUMED TO BE 298 K | | | | | | |
| --- | | | | | | |
| $CH_3CH_2CH_2CH_2OH + OH \rightarrow [.C_4H_9] + H_2O$ | | | | | | |
| 1-BUTANOL + HYDROXYL FREE RADICAL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 4.1(+12) | - | - | 0.9 | 1.1 |
| --- | | | | | | |
| $CH_3CH_2OCH_2CH_3 + OH \rightarrow$ products | | | | | | |
| ETHANE, 1,1'-OXYBIS-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 LIO/DAR1 REACTION ORDER: 2 | 305 | 5.6(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| --- | | | | | | |
| $(CH_3)_3COH \rightarrow (CH_3)_2C{=}CH_2 + H_2O$ | | | | | | |
| 2-PROPANOL, 2-METHYL- | | | | | | |
| 71 GON/LEW REACTION ORDER: 1 | 753-833 | 2.5(+5) | 0 | 15136 | | |
| --- | | | | | | |
| $(CH_3)_3COH + H \rightarrow (CH_3)_3C. + H_2O$ | | | | | | |
| 2-PROPANOL, 2-METHYL-, + HYDROGEN ATOM | | | | | | |
| 73 ADE/WAG2 REACTION ORDER: 2 | 295-700 | 4.0(+13) | 0 | 4125±300 | 0.9 | 1.1 |
| --- | | | | | | |
| $NCC{\equiv}CCN + N \rightarrow [N.C_4N_2^*]$ | | | | | | |
| 2-BUTYNEDINITRILE + NITROGEN ATOM | | | | | | |
| 76 HAN/OBE REACTION ORDER: 2 | 300 | 3.2(+9) | - | - | 0.2 | 1.8 |
| --- | | | | | | |
| $CH_3CH_2CH_2CN \rightarrow CH_3CH_2. + .CH_2CN$ | | | | | | |
| BUTANENITRILE | | | | | | |
| 75 KIN/GOD2 REACTION ORDER: 1 | 1090-2050 | 2.5(+15) | 0 | 38600±850 | 0.5 | 2.0 |
| --- | | | | | | |
| $(CH_3)_2CHCN \rightarrow CH_3CH{=}CH_2 + HCN$ | | | | | | |
| PROPANENITRILE, 2-METHYL- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 73 LAS/EMO — REACTION ORDER: 1 | 820-928 | 1.6(+12) | 0 | 32280±520 | 0.9 | 1.1 |
| 75 KIN/GOD1 | 1074-1253 | 7.9(+13) | 0 | 38350±1000 | 0.5 | 2.0 |
| $(CH_3)_2CHCN \rightarrow CH_3CH(.)CN + CH_3$ | | | | | | |
| PROPANE NITRILE, 2-METHYL- | | | | | | |
| 75 KIN/GOD1 — REACTION ORDER: 1 | 1074-1250 | 5.0(+15) | 0 | 39760±1000 | 0.5 | 2.0 |
| $CH_3CH_2N{=}NCH_2CH_3 \rightarrow$ products | | | | | | |
| DIAZENE, DIETHYL- | | | | | | |
| 73 FER/DEA — REACTION ORDER: 1 | 700-950 | 2.5(+16) | 0 | 25000±500 | | |
| $CH_3CH_2N{=}NCH_2CH_3 + CH_3CH_2. \rightarrow CH_3CH_2N{=}NCH_2CH_2. + CH_3CH_3$ | | | | | | |
| 76 SCH/KNO — REACTION ORDER: 1 | 525-556 | 7.9(+11) | 0 | 3775±1350 | 0.1 | 10.0 |
| $(CH_3)_2NN(CH_3)_2 \rightarrow (CH_3)_2N. + (CH_3)_2N.$ | | | | | | |
| HYDRAZINE, TETRAMETHYL- | | | | | | |
| 72 GEL/SOL — REACTION ORDER: 1 | 720-930 | 215(+17) | 0 | 27180 | | |
| $(CH_3)_3CNO \rightarrow (CH_3)C. + NO$ | | | | | | |
| PROPANE, 2-METHYL-2-NITROSO- | | | | | | |
| 74 CBO/MEN — REACTION ORDER: 1 | 550-850 | 550-850 | 0 | 18120±500 | 0.3 | 3.2 |
| $CH_3CH_2CH(CH_3)ONO \rightarrow CH_3CH_2COCH_3 + HONO$ | | | | | | |
| NITROUS ACID 1-METHYLPROPYL ESTER | | | | | | |
| 76 EAT/MCC2 — REACTION ORDER: 1 | 403-433 | 6.3(+12) | 0 | 18000±400 | 0.3 | 3.2 |
| $CH_3CH_2CH(CH_3)ONO \rightarrow CH_3CH_2CH(O.)CH_3 + NO$ | | | | | | |
| NITROUS ACID 1-METHYLPROPYL ESTER | | | | | | |
| 75 EAT/MCC — REACTION ORDER: 1 | 393-473 | 1.3(+16) | 0 | 20735±400 | 0.4 | 2.5 |
| 76 EAT/MCC2 | 403-433 | 1.6(+16) | 0 | 20600±400 | 0.4 | 2.5 |
| $CH_3CH_2CH(CH_3)ONO \rightarrow$ products | | | | | | |
| NITROUS ACID 1-METHYLPROPYL ESTER | | | | | | |
| 76 EAT/MCC2 — REACTION ORDER: 1 | 403-433 | 5.0(+15) | 0 | 19930±400 | 0.3 | 3.2 |
| $(CH_3)_3CONO \rightarrow (CH_3)_2C{=}CH_2 + HONO$ | | | | | | |
| NITROUS ACID 1,1-DIMETHYLETHYL ESTER | | | | | | |
| 74 EAT/MIL — REACTION ORDER: 1 | 393-473 | 7.9(+12) | 0 | 16910±400 | | |
| 75 EAT/MCC | 393-473 | 7.9(+12) | 0 | 18220 | 0.4 | 2.5 |
| 76 EAT/MIL | 393-433 | 7.9(+12) | 0 | 16910±400 | 0.4 | 2.5 |
| $(CH_3)_3CONO \rightarrow (CH_3)_2C{=}CH_2 + HONO + (CH_3)_3CO + NO$ | | | | | | |
| NITROUS ACID 1,1-DIMETHYLETHYL ESTER | | | | | | |
| 74 EAT/MIL — REACTION ORDER: 1 | 393-473 | 5.0(+14) | 0 | 18220±400 | 0.4 | 2.5 |
| $(CH_3)_3CONO \rightarrow (CH_3)_3CO. + NO$ | | | | | | |
| NITROUS ACID, 1,1-DIMETHYLETHYL- | | | | | | |
| 74 EAT/MIL — REACTION ORDER: 1 | 393-473 | 2.0(+16) | 0 | 20280±400 | 0.4 | 2.5 |
| 75 MEN/GOL — REACTION ORDER: 1 | 300 | 6.3(+15) | 0 | 19780 | | |
| 75 EAT/MCC | 393-473 | 2.0(+16) | 0 | 20280±400 | 0.4 | 2.5 |
| 76 EAT/MIL | 393-433 | 2.0(+16) | 0 | 20280±400 | 0.4 | 2.5 |
| $(CH_3)_3CONO \rightarrow$ products (OVERALL) | | | | | | |
| NITROUS ACID 1,1-DIMETHYLETHYL ESTER | | | | | | |
| 76 EAT/MIL — REACTION ORDER: 1 | 393-433 | 5.0(+14) | 0 | 18220 | | |
| $(CH_3)_3CONO_2 \rightarrow (CH_3)_3CO. + NO_2$ | | | | | | |
| NITRIC ACID 1,1-DIMETHYLETHYL ESTER | | | | | | |
| 76 EAT/MIL — REACTION ORDER: 1 | 393-433 | 7.9(+15) | 0 | 20230 | | |
| NOTE: EVALUATION | | | | | | |
| $(CH_3CH_2NO)_2 \rightarrow CH_3CH_2NO + CH_3CH_2NO$ | | | | | | |
| ETHANE NITROSO-, DIMER | | | | | | |
| 72 TAN/LAM — REACTION ORDER: 1 | 314 | 4.1(-3) | - | - | 0.9 | 1.1 |
| $cis\text{-}CH_2{=}CHCH{=}CHCH_3 \rightarrow trans\text{-}CH_2{=}CHCH{=}CHCH_3$ | | | | | | |
| cis-1,3-PENTADIENE | | | | | | |
| 75 CBA/RES — REACTION ORDER: 1 $k/k_{ref}$: 1.3 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $trans\text{-}CH_2{=}CHCH{=}CHCH_3 \rightarrow cis\text{-}CH_2{=}CHCH{=}CHCH_3$ | | | | | | |
| $(CH_3)_2C{=}CH_2 + O \rightarrow$ products | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 1,2-BUTADIENE, 3-METHYL-, + OXYGEN ATOM<br>74 HAU REACTION ORDER: 2 $k/k_{ref}$: 0.76<br>NOTE: $k_{ref}$: $(CH_3)_2C{=}CHCH_3 + O \rightarrow$ products | 298 | - | - | - | | |
| $CH_2{=}CH(CH_3){=}CH_2 + NO_2 \rightarrow$ products<br>1,3-BUTADIENE, 2-METHYL-, + NITROGEN OXIDE ($NO_2$)<br>75 GEY/ROZ REACTION ORDER: 2 | 273-433 | 1.7(+7) | 0 | 1060 | | |
| $CH_3CH{=}CHCH_2CH_2\cdot \rightarrow CH_3CH_2CH{=}CHCH_2\cdot + CH_3CH_2CH(\cdot)CH{=}CH_2$<br>3-PENTENYL FREE RADICAL<br>75 STE/RAB REACTION ORDER: 1 | 298 | 2.0(+9) | - | - | | |
| $CH_3CH{=}CHCH_2CH_2\cdot + CH_3CH_2\cdot \rightarrow$ cis-$CH_3CH{=}CHCH{=}CH_2 + CH_3CH_3$<br>3-PENTENYL FREE RADICAL + ETHYL FREE RADICAL<br>75 STE/RAB REACTION ORDER: 2 $k/k_{ref}$: 0.087<br>NOTE: $k_{ref}$: $CH_3CH{=}CHCH_2CH_2\cdot + CH_3CH_2\cdot \rightarrow$ $CH_3CH{=}CHCH_2CH_2CH_2CH_3$ | 298 | - | - | - | 0.9 | 1.1 |
| $CH_3CH{=}CHCH_2CH_2\cdot + CH_3CH_2\cdot \rightarrow CH_3CH{=}CHCH_2CH_3 + CH_2{=}CH_2$<br>3-PENTENYL FREE RADICAL + ETHYL FREE RADICAL<br>75 STE/RAB REACTION ORDER: 2 $k/k_{ref}$: 0.093<br>NOTE: $k_{ref}$: $CH_3CH{=}CHCH_2CH_2\cdot + CH_3CH_2\cdot \rightarrow CH_3CH{=}CHCH_2CH_2CH_2CH_3$ | 298 | - | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2CH{=}CH_2 \rightarrow$ products<br>1-PENTENE<br>73 SHI/KIN1 REACTION ORDER: 1 | 753-1023 | 1.6(+12) | 0 | 26170 | | |
| $CH_3CH_2CH_2CH{=}CH_2 + O_3 \rightarrow$ products<br>1-PENTENE + OZONE<br>74 JAP/WU REACTION ORDER: 2 | 298 | 6.4(+6) | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2CH{=}CH_2 + H \rightarrow CH_3CH_2CH_2CH(\cdot)CH_3$<br>1-PENTENE + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: $CH_3CH_2CH_2CH{=}CH_2 + H \rightarrow CH_3CH_2CH_2CH_2CH_2\cdot$ | 923 | - | - | - | | |
| $CH_3CH_2CH_2CH{=}CH_2 + H \rightarrow CH_3CH_2CH_2CH(\cdot)CH_3 + CH_3CH_2CH_2CH_2CH_2\cdot$<br>1-PENTENE + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 9.0<br>NOTE: $k_{ref}$: $CH_2CH_2CH_2CH{=}CH_2 + H \rightarrow CH_3CH_2CH(\cdot)CH{=}CH_2$ $+ \cdot CH_2CH_2CH_2CH{=}CH_2 + CH_3CH(\cdot)CH_2CH{=}CH_2 + H_2$ | 923 | - | - | - | | |
| $CH_3CH_2CH_2CH{=}CH_2 + H + M \rightarrow CH_3CH_2CH_2CH(\cdot)CH_3$ $+ CH_3CH_2CH_2CH_2CH_2\cdot + M$<br>1-PENTENE + HYDROGEN ATOM<br>71 COW/KEI REACTION ORDER: 2 M: He<br>NOTE: DISCHARGE FLOW METHOD. 3.0 TORR PRESSURE. | 298 | 6.4(+11) | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2CH{=}CH_2 + H + M \rightarrow CH_3CH_2CH_2CH(\cdot)CH_3$ $+ CH_3CH_2CH_2CH_2CH_2\cdot + M$<br>1-PENTENE + HYDROGEN ATOM<br>71 COW/KEI REACTION ORDER: 2<br>NOTE: STEADY STATE PHOTOLYSIS METHOD. 10-15 TORR. PRESSURE.r M = Ne, Ar | 298 | 7.8(+11) | - | - | 0.7 | 1.3 |
| $CH_3CH_2CH_2CH{=}CH_2 + OH \rightarrow$ products<br>1-PENTENE + HYDROXYL FREE RADICAL<br>71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 2.5<br>NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | 300 | - | - | - | | |
| $CH_3CH_2CH{=}CHCH_3 + OH \rightarrow$ products<br>2-PENTENE + HYDROXYL FREE RADICAL<br>71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 5.3<br>NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | 300 | - | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH{=}CH_2 + NO_2 \rightarrow$ products<br>1-PENTENE + NITROGEN OXIDE ($NO_2$)<br>71 JAF REACTION ORDER: 2 | 298-373 | 1.6(+6) | 0 | 3650 | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH{=}CH_2 + CH_3 \rightarrow CH_3CH_2CH_2CH(.)CH_2CH_3 + CH_3CH_2CH_2CH(CH_3)CH_2.$<br>1-PENTENE + METHYL FREE RADICAL<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 1.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_2CH{=}CH_2 + CH_3 \rightarrow CH_3CH_2CH(.)CH{=}CH_2 + .CH_2CH_2CH_2CH{=}CH_2 + CH_3CH(.)CH_2CH{=}CH_2 + CH_4$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH{=}CHCH_3 \rightarrow$ products<br>2-PENTENE<br>72 SHI/AMA REACTION ORDER:1 | 753-1003 | 2.0(+12) | 0 | 26675 | | |
| ---------- | | | | | | |
| $CH_3CH_2CH{=}CHCH_3 + H \rightarrow CH_3CH_2CH(.)CH_2CH_3$<br>2-PENTENE + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 1.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH{=}CHCH_3 + H \rightarrow CH_2CH_2CH_2CH(.)CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH{=}CHCH_3 + H \rightarrow CH_3CH_2CH(.)CH_2CH_3 + CH_3CH_2CH_2CH(.)CH_3$<br>2-PENTENE + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH{=}CHCH_3 + H \rightarrow CH_3CH_2CH{=}CHCH_2.$<br>$+ CH_3CH(.)CH{=}CHCH_3 + .CH_2CH_2CH{=}CHCH_3 + H_2$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH{=}CHCH_3 + CH_3 \rightarrow CH_3CH_2CH(.)CH(CH_3)_2 + CH_3CH_2CH(CH_3)CH(.)CH_3$<br>2-PENTENE + METHYL FREE RADICAL<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 0.2 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH{=}CHCH_3 + CH_3 \rightarrow CH_3CH_2CH{=}CHCH_2.$<br>$+ CH_3CH(.)CH{=}CHCH_3 + .CH_2CH_2CH{=}CHCH_3 + CH_4$ | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH_2CH{=}CHCH_3 + SO_2^*(^3B_1) \rightarrow [SO_2.CH_3CH_2CH{=}CHCH_3]^*$<br>cis-2-PENTENE + SULFUR DIOXIDE<br>76 WAM REACTION ORDER: 2 | 295 | 6.3(+13) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| cis-$CH_3CH_2CH{=}CHCH_3 + CH_3C(O)OO. \rightarrow$ cy-$(CH_3CH_2)CHCH(CH_3)O + CH_3. + CO_2$<br>cis-2-PENTENE + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>77 DIA/WAD REACTION ORDER: 2 | 393 | 1.4(+8) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| cis-$CH_3CH_2CH{=}CHCH_3 + CH_3C(O)OOH \rightarrow$ cy-$(CH_3CH_2)CHCH(CH_3)O + CH_3COOH$<br>cis-2-PENTENE + ETHANEPEROXOIC ACID<br>77 DIA/WAD REACTION ORDER: 2 | 393 | 4.3(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| cis-$CH_3CH_2CH{=}CHCH_3 + M \rightarrow$ trans-$CH_3CH_2CH{=}CHCH_3 + M$<br>cis-2-PENTENE<br>74 SPK/AKI REACTION ORDER: 2 M: $NO_2$ | 298-381 | 3.1(+10) | 0 | 5640 | | |
| ---------- | | | | | | |
| trans-$CH_3CH_2CH{=}CHCH_3 + SO_2^*(^3B_1) \rightarrow [SO_2.CH_3CH_2CH{=}CHCH_3]^*$<br>trans-2-PENTENE + SULFUR DIOXIDE<br>76 WAM REACTION ORDER: 2 | 295 | 1.0(+14) | - | - | 0.7 | 1.3 |
| ---------- | | | | | | |
| trans-$CH_3CH_2CH{=}CHCH_3 + CH_3C(O)OO. \rightarrow$ cy-$(CH_3CH_2)CHCH(CH_3)O + CH_3. + CO_2$<br>trans-2-PENTENE + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>77 DIA/WAD REACTION ORDER: 2 | 393 | 1.4(+8) | - | - | 0.4 | 1.6 |
| ---------- | | | | | | |
| trans-$CH_3CH_2CH{=}CHCH_3 + CH_3C(O)OOH \rightarrow$ cy-$(CH_3CH_2)CHCH(CH_3)O + CH_3$ [illegible] | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| trans-2-PENTENE + ETHANEPERØXØIC ACID<br>77 DIA/WAD REACTIØN ØRDER: 2 | 393 | 4.3(+1) | - | - | 0.6 | 1.4 |
| ---------- | | | | | | |
| trans-$CH_3CH_2CH{=}CHCH_3$ + M → cis-$CH_3CH_2CH{=}CHCH_3$ + M<br>trans-2-PENTENE<br>74 SPR/AKI REACTIØN ØRDER: 2 | 298-382 | 5.2(+10) | 0 | 6290 | | |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ → $CH_3$ + $.CH_2C(CH_3){=}CH_2$<br>1-BUTENE, 2-METHYL<br>77 TRE/WRI REACTIØN ØRDER: 1<br>NØTE: LIMITING HIGH PRESSURE k. | 671-722 | 4.0(+16) | 0 | 35730±400 | 0.4 | 2.5 |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2^*$ → $CH_3$ + $.CH_2C(CH_3){=}CH_2$<br>1-BUTENE, 2-METHYL-<br>71 TAY/SIM REACTIØN ØRDER: 1<br>NØTE: AT 3660A°. UNREPØRTED T, ASSUMED TØ BE 298K. | 298 | 5.9(+7) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2^*$ → $CH_3$ + $.CH_2C(CH_3){=}CH_2$<br>1-BUTENE, 2-METHYL-<br>71 TAY/SIM REACTIØN ØRDER: 1<br>NØTE: AT 4358A°. UNREPØRTED T, ASSUMED TØ BE 298K. | 298 | 3.4(+7) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + H → $CH_3CH_2C(.)(CH_3)_2$<br>1-BUTENE, 2-METHYL-, + HYDRØGEN ATØM<br>74 SHI/AMA REACTIØN ØRDER: 2 $k/k_{ref}$: 4.0<br>NØTE: $k_{ref}$: $CH_3CH_2C(CH_3){=}CH_2$ + H → $CH_3CH_2CH(CH_3)CH_2.$ | 923 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + H → $CH_3CH_2C(.)(CH_3)_2$ + $CH_3CH_2CH(CH_3)CH_2.$<br>1-BUTENE, 2-METHYL-, + HYDRØGEN ATØM<br>74 SHI/AMA REACTIØN ØRDER: 2 $k/k_{ref}$: 13.0<br>NØTE: $k_{ref}$: $CH_3CH_3C(CH_3){=}CH_2$ + H → $CH_3CH(.)C(CH_3){=}CH_2$<br>+ $.CH_2CH_2C(CH_3){=}CH_2$ + $CH_3CH_2C(CH_2.){=}CH_2$ + $H_2$ | 923 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + H + M → $CH_3CH_2C(.)(CH_3)_2$<br>+ $CH_3CH_2CH(CH_3)CH_2.$ + M<br>1-BUTENE, 2-METHYL-, + HYDRØGEN ATØM<br>71 DAB/NIK REACTIØN ØRDER: 2 M: He<br>NØTE: 0.7 to 1.3 TØRR. He PRESSURE. | 298 | 9.1(+11) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + D + M → $CH_3CH_2C(.)(CH_3)CH_2D$<br>+ $CH_3CH_2CD(CH_3)CH_2.$ + M<br>1-BUTENE, 2-METHYL-, + DEUTERIUM ATØM<br>71 DAB/NIK REACTIØN ØRDER: 2 M: He<br>NØTE: 1.2 to 2.6 TØRR. He PRESSURE. | 298 | 2.1(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + ØH → products<br>1-BUTENE, 2-METHYL-, + HYDRØXYL FREE RADICAL<br>71 MØR/NIK2 REACTIØN ØRDER: 2 $k/k_{ref}$: 5.3<br>NØTE: $k_{ref}$: $CH_3CH{=}CH_2$ + ØH → products | 300 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + S → cy-$(CH_3CH_2)C(CH_3)CH_2S$<br>1-BUTENE, 2-METHYL-, + SULFUR ATØM<br>71 STR/Ø'C REACTIØN ØRDER: 2<br>NØTE: $k/k_{ref}$: 0.78 exp(+1424/T); $k_{ref}$: $CH_2{=}CH_2$ + S →<br>cy-$CH_2CH_2S$<br>CØNVENTIØNAL PHØTØLYSIS METHØD | 298-450 | - | - | - | | |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + $CH_3C(Ø)ØØ.$ → cy-$[(CH_3CH_2)C(CH_3)]CH_2Ø$<br>+ $CH_3.$ + $CØ_2$<br>1-BUTENE, 2-METHYL-, + ETHYLDIØXY, 1-ØXØ-, FREE RADICAL<br>74 DIA/WAD REACTIØN ØRDER: 2<br>77 DIA/WAD | 393<br>393 | 5.0(+8)<br>1.5(+8) | -<br>- | -<br>- | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2C(CH_3){=}CH_2$ + $CH_3C(Ø)ØØH$ → cy-$[(CH_3CH_2)C(CH_3)]CH_2Ø$<br>+ $CH_3CØØH$<br>1-BUTENE, 2-METHYL-, + ETHANEPERØXØIC ACID | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 6.0(+1) | - | - | 0.6 | 1.4 |
| $(CH_3)_2CHCH{=}CH_2$ → $CH_3$ + $CH_3CH(.)CH{=}CH_2$ | | | | | | |
| 1-BUTENE, 3-METHYL- | | | | | | |
| 71 TAY/SIM REACTION ORDER: 1 | 298 | 1.7(+8) | - | - | 0.7 | 1.3 |
| NOTE: AT 3660Å. UNREPORTED T, ASSUMED TO BE 298K. | 298 | 1.0(+8) | - | - | 0.7 | 1.3 |
| NOTE: AT 4358Å. UNREPORTED T, ASSUMED TO BE 298K. | | | | | | |
| $(CH_3)_2CHCH{=}CH_2$ + O → cy-$[(CH_3)_2CH]CHCH_2O$ | | | | | | |
| 1-BUTENE, 3-METHYL-, + OXYGEN ATOM | | | | | | |
| 76 SIN/CVE REACTION ORDER: 2 | 298-480 | 6.0(+12) | 0 | 266±26 | 0.9 | 1.1 |
| $(CH_3)_2CHCH{=}CH_2$ + O → products | | | | | | |
| 1-BUTENE, 3-METHYL-, + OXYGEN ATOM | | | | | | |
| 74 MCC REACTION ORDER: 2 $k/k_{ref}$: 0.22 | 298 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2$ + O → products | | | | | | |
| $(CH_3)_2CHCH{=}CH_2$ + H + M → $(CH_3)_2CHCH(.)CH_3$ + $(CH_3)_2CHCH_2CH_2.$ + M | | | | | | |
| 1-BUTENE, 3-METHYL-, + HYDROGEN ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 7.3(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 to 2.7 TORR. He PRESSURE. | | | | | | |
| $(CH_3)_2CHCH{=}CH_2$ + D + M → $(CH_3)_2CHCH(.)CH_2D$ + $(CH_3)_2CHCHDCH_2.$ + M | | | | | | |
| 1-BUTENE, 3-METHYL-, + DEUTERIUM ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 7.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 to 2.6 TORR. He PRESSURE. | | | | | | |
| $(CH_3)_2CHCH{=}CH_2$ + OH → products | | | | | | |
| 1-BUTENE, 3-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 77 ATK/PER3 REACTION ORDER: 2 | 299-424 | 3.2(+12) | 0 | -533±150 | 0.9 | 1.1 |
| $(CH_3)_2CHCH{=}CH_2$ + $CH_3C(O)OO.$ → cy-$[(CH_3)_2CH]CHCH_2O$ + $CH_3.$ + $CO_2$ | | | | | | |
| 1-BUTENE, 3-METHYL-, + ETHYLDIOXY, 1-OXO-, FREE RADICAL | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 1.3(+7) | - | - | 0.5 | 1.5 |
| $(CH_3)_2CHCH{=}CH_2$ + $CH_3C(O)OOH$ → cy-$[(CH_3)_2CH]CHCH_2O$ + $CH_3COOH$ | | | | | | |
| 1-BUTENE, 3-METHYL, + ETHANEPEROXOIC ACID | | | | | | |
| 77 DIA/WAD REACTION ORDER: 2 | 393 | 1.0(+1) | - | - | 0.8 | 1.2 |
| $CH_3CH{=}C(CH_3)_2$ + O → cy-$(CH_3)CHC(CH_3)_2O$ | | | | | | |
| 2-BUTENE, 2-METHYL-, + OXYGEN ATOM | | | | | | |
| 74 FUR/ATK REACTION ORDER: 2 | 298 | 3.1(+13) | - | - | 0.9 | 1.1 |
| $CH_3CH{=}C(CH_3)_2$ + $O_2^*(^1\Delta_g)$ → $CH_2{=}CHC(CH_3)_2OOH$ + $CH_2{=}C(CH_3)CH(CH_3)OOH$ | | | | | | |
| 2-BUTENE, 2-METHYL-, + OXYGEN MOLECULE | | | | | | |
| 73 BUI/HER REACTION ORDER: 2 | 298 | 3.3(+7) | - | - | | |
| 75 ASH/OGR | 300-500 | 1.3(+11) | 0 | 2465±140 | 0.7 | 1.4 |
| $CH_3CH{=}C(CH_3)_2$ + $O_3$ → products | | | | | | |
| 2-BUTENE, 2-METHYL-, + OZONE | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 3.0(+8) | - | - | 0.9 | 1.1 |
| 75 BUI/HER | 227-363 | 3.8(+9) | 0 | 826±78 | 0.8 | 1.3 |
| NOTE: IN 0.0075 TORR. OF $O_2$ AS SCAVENGER | | | | | | |
| $CH_3CH{=}C(CH_3)_2$ + H → $CH_3CH_2C(.)(CH_3)_2$ | | | | | | |
| 2-BUTENE, 2-METHYL-, + HYDROGEN ATOM | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 4.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}C(CH_3)_2$ → $CH_3CH(.)CH(CH_3)_2$ | | | | | | |
| $CH_3CH{=}C(CH_3)_2$ + H → $CH_3CH_2C(.)(CH_3)_2$ + $CH_3CH(.)CH(CH_3)_2$ | | | | | | |
| 2-BUTENE, 2-METHYL-, + HYDROGEN ATOM | | | | | | |
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}C(CH_3)_2$ + H → $CH_3CH{=}C(CH_3)CH_2.$ + $.CH_2CH{=}C(CH_3)_2$ + $H_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + H \rightarrow CH_3CH_2C(.)(CH_3)_2^*$<br>2-BUTENE, 2-METHYL-, + HYDROGEN ATOM<br>74 LAU/BUE REACTION ORDER: 2 $k/k_{ref}$: 1.25 | 298 | - | - | - | 0.8 | 1.35 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + H \rightarrow CH_3CH_2.^*$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + H + M \rightarrow CH_3CH(.)CH(CH_3)_2 + CH_3CH_2C(.)(CH_3)_2 + M$<br>2-BUTENE, 2-METHYL-, + HYDROGEN ATOM<br>71 DAE/NIK REACTION ORDER: 2 M: He | 298 | 8.2(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.7 to 1.3 torr. He PRESSURE. | | | | | | |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + H + M \rightarrow CH_3CH(.)CD(CH_3)_2 + CH_3CHC(.)(CH_3)_2 + M$<br>2-BUTENE, 2-METHYL-, + DEUTERIUM ATOM<br>71 DAE/NIK REACTION ORDER: 2 M: He | 298 | 9.2(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 to 2.6 torr. He PRESSURE. | | | | | | |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + OH \rightarrow$ products<br>2-BUTENE, 2-METHYL-, + HYDROXYL FREE RADICAL<br>71 MCR/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 7.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + S \rightarrow cy\text{-}(CH_3)CHC[(CH_3)_2]S$<br>2-BUTENE, 2-METHYL-, + SULFUR ATOM<br>71 STR/CSC REACTION ORDER: 2 | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.51 exp(+1515/T); $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + OH \rightarrow$ products<br>2-BUTENE, 2-METHYL-, + HYDROXYL FREE RADICAL<br>76 ATK/PER1 REACTION ORDER: 2 | 297-425 | 2.2(+13) | 0 | -226±200 | | |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + NO_2 \rightarrow$ products<br>2-BUTENE, 2-METHYL-, + NITROGEN OXIDE ($NO_3$)<br>75 JAP/NIK REACTION ORDER: 2 | 300 | 3.3(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + CH_3C(O)OO. \rightarrow cy\text{-}(CH_3)CHC(CH_3)_2O + CH_3 + CO_2$<br>2-BUTENE, 2-METHYL-, + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>77 DIA/WAD REACTION ORDER: 2 | 370-410 | 1.2(+11) | 0 | 1965±110 | 0.8 | 1.3 |
| ---------- | | | | | | |
| $CH_3CH{=}C(CH_3)_2 + CH_3C(O)OOH \rightarrow cy\text{-}(CH_3)CHC(CH_3)_2O + CH_3COOH$<br>2-BUTENE, 2-METHYL-, + ETHANEPEROXOIC ACID<br>77 DIA/WAD REACTION ORDER: 2 | 370-410 | 1.7(+11) | 0 | 7410±290 | 0.5 | 2.1 |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_2CH_2. \rightarrow CH_3CH_2CH_2CH(.)CH_3$<br>PENTYL FREE RADICAL<br>71 WAT REACTION ORDER: 1 | 297-435 | 3.3(+8) | 0 | 7600 | | |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_2CH_2. + CH_3. \rightarrow CH_3CH_2CH_2CH{=}CH_2 + CH_4$<br>PENTYL FREE RADICAL + METHYL FREE RADICAL<br>71 WAT REACTION ORDER: 2 $k/k_{ref}$: ≥0.33 | 298 | - | - | - | | |
| NOTE: LOWER LIMIT ESTIMATE.<br>$k_{ref}$: $CH_3CH_2CH_2CH_2CH_2. + CH_3. \rightarrow CH_3(CH_2)_4CH_3$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH_2CH_2CH_2. + CH_3CH_2CH_2CH_2CH_2. \rightarrow CH_3CH_2CH_2CH{=}CH_2 + CH_3CH_2CH_2CH_2CH_3$<br>PENTYL FREE RADICAL<br>71 WAT REACTION ORDER: 2 $k/k_{ref}$: 0.14 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_2CH_2CH_2. + CH_3CH_2CH_2CH_2CH_2. \rightarrow CH_3(CH_2)_4CH_3$ | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CH_2CH_2CH_2CH_2\cdot + CH_3CH_2CH_2CH_2CH_2N{=}NCH_3 \rightarrow CH_3CH_2CH_2CH_2CH_3 + \cdot CH_2CH_2CH_2CH_2CH_2N{=}NCH_3$ | | | | | | |
| PENTYL FREE RADICAL + DIAZENE, METHYL PENTYL- | | | | | | |
| 71 WAT REACTION ORDER: 2 | 297-435 | 4.2(+11) | 0 | 3925 | | |
| $(CH_3)_3CCH_2\cdot \rightarrow CH_3\cdot + (CH_3)_2C{=}CH_2$ | | | | | | |
| PROPYL, 2,2-DIMETHYL-, FREE RADICAL | | | | | | |
| 75 SZI/MAR REACTION ORDER: 1 | 512-571 | 2.0(+13) | 0 | 15000±1000 | 0.2 | 6.3 |
| NOTE: EVALUATION | | | | | | |
| $CH_3CH_2CH_2CH_2CH_3^* \rightarrow CH_3\cdot + CH_3CH_2\cdot + CH_3CH_2CH_2\cdot + CH_3CH_2CH_2CH_2\cdot$ | | | | | | |
| PENTANE | | | | | | |
| 72 BAS/JOH REACTION ORDER: 1 | 298 | 1.5(+6) | - | - | 0.9 | 1.1 |
| NOTE: 0.066 TORR | 298 | 1.8(+6) | - | - | 0.9 | 1.1 |
| NOTE: 0.079 TORR | | | | | | |
| $CH_3CH_2CH_2CH_2CH_3 + O^*(^1D) \rightarrow$ products | | | | | | |
| PENTANE + OXYGEN ATOM | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 0.988 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_4C + O^*(^1D) \rightarrow$ products | | | | | | |
| $CH_3CH_2CH_2CH_2CH_3 + {}^1CH_2^* \rightarrow CH_3(CH_2)_4CH_3$ | | | | | | |
| PENTANE + METHYLENE FREE RADICAL | | | | | | |
| 75 ZAB/CAR REACTION ORDER: 2 $k/k_{ref}$: 11.1 | 298 | - | - | - | | |
| NOTE: ${}^1CH_2^*(^1A_1)$ STATE. $k_{ref}$: $CH_2^*(^1A_1) + M \rightarrow CH_2(^3B_1) + M$ | | | | | | |
| $(CH_3)_2CHCH_2CH_3^* \rightarrow CH_3\cdot + CH_3CH_2\cdot + (CH_3)_2CH\cdot + CH_3CH_2CH(\cdot)CH_3 + (CH_3)_2CHCH_2\cdot$ | | | | | | |
| BUTANE, 2-METHYL- | | | | | | |
| 72 BAS/JOH REACTION ORDER: 1 | 298 | 2.9(+6) | - | - | 0.9 | 1.1 |
| NOTE: AVERAGE OF 2 K'S AT 0.12 AND 0.13 TORR | 298 | 1.9(+6) | - | - | 0.8 | 1.2 |
| NOTE: AVERAGE OF 2 k's AT 0.071 AND 0.091 TORR | | | | | | |
| $(CH_3)_2CHCH_2CH_3 + O_2 \rightarrow (CH_3)_2C(\cdot)CH_2CH_3 + (CH_3)_2CHCH(\cdot)CH_3 + HO_2$ | | | | | | |
| BUTANE, 2-METHYL-, + OXYGEN MOLECULE | | | | | | |
| 73 LEG/DEN REACTION ORDER: 2 | 410-439 | 1.5(15) | 0 | 19120 | | |
| $(CH_3)_2CHCH_2CH_3 + OH \rightarrow$ products | | | | | | |
| BUTANE, 2-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 LLO/DAR2 REACTION ORDER: 2 | 305 | 2.0(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| $(CH_3)_4C \rightarrow (CH_3)_3C\cdot + CH_3$ | | | | | | |
| PROPANE, 2,2-DIMETHYL- | | | | | | |
| 71 EAR/DZI REACTION ORDER: 1 | 723-803 | 6.3(+16) | 0 | 41270 | | |
| $(CH_3)_4C \rightarrow (CH_3)_3C\cdot + CH_3\cdot$ | | | | | | |
| PROPANE, 2,2-DIMETHYL- | | | | | | |
| 72 MAR/PUR REACTION ORDER: 1 | 756-845 | 1.3(+16) | 0 | 39700±1100 | 0.1 | 10 |
| 73 PAC | 793-953 | 5.0(+17) | 0 | 42820±720 | 0.5 | 2.0 |
| 76 ERA/WES1 | 1030-1300 | 3.3(+16) | 0 | 40415 | 0.8 | 1.3 |
| $(CH_3)_4C + O^*(^1D) \rightarrow (CH_3)_3CCH_2\cdot + OH$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + OXYGEN ATOM | | | | | | |
| 71 SCO/CVE REACTION ORDER: 2 $k/k_{ref}$: 4.29 | 296 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $N_2O + O^*(^1D) \rightarrow N_2 + O_2 + NO + NO$ | | | | | | |
| 76 FLE/HUS | 300 | 7.4(+14) | - | - | 0.9 | 1.1 |
| $(CH_3)_4C + O^*(^1D) \rightarrow$ products | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + OXYGEN ATOM | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 75 GAU/SNE REACTION ORDER: 2 $k/k_{ref}$: 14.0 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $O_2 + O^*(^1D) \rightarrow O_2^*(^1\Sigma_g^+) + O$ | | | | | | |
| NOTE: EVALUATION | 300 | 6.3(+14) | - | - | | |
| ---------- | | | | | | |
| $(CH_3)_4C + H \rightarrow (CH_3)_3CCH_2. + H_2$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + HYDROGEN ATOM | | | | | | |
| 76 EAK/BAL REACTION ORDER: 2 $k/k_{ref}$: 52.0 | 753 | - | - | - | | |
| NOTE: $k_{ref}$: $O_2 + H \rightarrow O + OH$ (OPTIMIZATION) | | | | | | |
| NOTE: EVALUATION | 753 | 2.4(+11) | - | - | | |
| ---------- | | | | | | |
| $(CH_3)_4C + OH \rightarrow (CH_3)_3CCH_2. + H_2O$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 EAK/BAL REACTION ORDER: 2 $k/k_{ref}$: 10.0 | 753 | - | - | - | | |
| NOTE: $k_{ref}$: $H_2 + OH \rightarrow H + H_2O$ (OPTIMIZATION) | | | | | | |
| NOTE: EVALUATION | 753 | 3.9(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CH_3)_4C + CD_2 \rightarrow (CH_3)_3CCH_2. + CD_2H$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + METHYLENE-$d_2$ FREE RADICAL | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 $k/k_{ref}$: 2.1 | 576-706 | - | - | - | 0.8 | 1.2 |
| NOTE: $k_{ref}$: $CD_2{=}C{=}O + CD_2 \rightarrow .CD{=}C{=}O + CD_3$ | | | | | | |
| REACTION ORDER: 2 | 653 | 1.5(+11) | - | - | 0.5 | 1.5 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_4C + CH_3 \rightarrow (CH_3)_3CCH_2. + CH_4$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + METHYL FREE RADICAL | | | | | | |
| 71 MCN/KEL REACTION ORDER: 2 $k/k_{ref}$: 6.7 | 576-706 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CD_2{=}C{=}O + CH_3 \rightarrow .CD{=}C{=}O + CH_3D$ | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_4C + CH_3 \rightarrow (CH_3)_3CCH_2. + CH_4$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + METHYL FREE RADICAL | | | | | | |
| 73 PAC REACTION ORDER: 2 | 793-953 | 3.2(+13) | 0 | 8060±240 | 0.8 | 1.3 |
| 76 EBA/WES1 | 1030-1300 | 6.6(+14) | 0 | 10825 | 0.6 | 1.7 |
| ---------- | | | | | | |
| $(CH_3)_4C + CH{\equiv}C. \rightarrow (CH_3)_3CCH_2. + CH{\equiv}CH$ | | | | | | |
| PROPANE, 2,2-DIMETHYL-, + ETHYNYL FREE RADICAL | | | | | | |
| 73 CUL/HUC REACTION ORDER: 2 $k/k_{ref}$: 0.91 | 298 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $CH{\equiv}CBr + CH{\equiv}C. \rightarrow Br. + CH{\equiv}CC{\equiv}CH$ | | | | | | |
| ---------- | | | | | | |
| $CH_3C{\equiv}CCH_2COOH \rightarrow CH_3CH{=}C{=}CH_2 + CO_2$ | | | | | | |
| 3-PENTYNOIC ACID | | | | | | |
| 76 BIG/WEA1 REACTION ORDER: 1 | 500-663 | 2.4(+11) | 0 | 19440±760 | 0.4 | 2.6 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$ | | | | | | |
| ---------- | | | | | | |
| $CH_3C{\equiv}CCH_2COOD \rightarrow CH_3CD{=}C{=}CH_2 + CO_2$ | | | | | | |
| 3-PENTYNOIC ACID-D | | | | | | |
| 76 BIG/WEA1 REACTION ORDER: 1 | 630 | 3.3(-3) | - | - | | |
| ---------- | | | | | | |
| $CH_2{=}C{=}CHCH_2COOH \rightarrow CH_2{=}CHCH{=}CH_2 + CO_2$ | | | | | | |
| 3,4-PENTADIENOIC ACID | | | | | | |
| 76 BIG/WEA2 REACTION ORDER: 1 | 500-715 | 1.1(+11) | 0 | 20150±750 | 0.4 | 2.6 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH{=}CHCH_2COOH \rightarrow CH_3CH{=}CHCH_3 + CO_2$ | | | | | | |
| 3-PENTENOIC ACID | | | | | | |
| 76 BIG/WEA1 REACTION ORDER: 1 | 500-720 | 2.3(+11) | 0 | 20810±780 | 0.3 | 3.5 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$ | | | | | | |
| ---------- | | | | | | |
| $CH_3COCOCH_2CH_3 \rightarrow CH_3C(O). + CH_3CH_2C(O).$ | | | | | | |
| 2,3-PENTANEDIONE | | | | | | |
| 74 SCH/KNO REACTION ORDER: 1 | 362-398 | 7.9(+16) | 0 | 33970±1460 | | |
| NOTE: ORDER OF MAGNITUDE ESTIMATE: k=0.1k(OVERALL). | | | | | | |
| ---------- | | | | | | |
| $CH_3COCOCH_2CH_3 \rightarrow$ products (OVERALL) | | | | | | |
| 2,3-PENTANEDIONE | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 SCH/KNO REACTION ORDER: 1 | 362-398 | 7.9(+17) | 0 | 33970±1460 | 0.1 | 10. |
| $CH_3COCOCH_2CH_3 + CH_3 \rightarrow CH_3COCOCH(.)CH_3 + CH_4$ | | | | | | |
| 2,3-PENTANEDIONE + METHYL FREE RADICAL | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 4.5 | 362-398 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3COCOCH_2CH_3 + CH_3 \rightarrow .CH_2COCOCH_2CH_3 + CH_4$ | | | | | | |
| $CH_3COCOCH_2CH_3 + CH_3 \rightarrow CH_3COCOCH_2CH_2. + CH_4$ | | | | | | |
| 2,3-PENTANEDIONE + METHYL FREE RADICAL | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 0.3 | 362-398 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3COCOCH_2CH_3 + CH_3 \rightarrow .CH_2COCOCH_2CH_3 + CH_4$ | | | | | | |
| $CH_3COCOCH_2CH_3 + CH_3 \rightarrow .CH_2COCOCH_2CH_3 + CH_3COCOCH(.)CH_3 + CH_3COCOCH_2CH_2. + CH_4$ | | | | | | |
| 2,3-PENTANEDIONE + METHYL FREE RADICAL | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 | 362-398 | - | - | - | 0.4 | 2.5 |
| NOTE: $k_{ref}$: $CH_3COCOCH_2CH_3 + CH_3 \rightarrow CH_3CH_2C(O). + CH_3COCH_3$ | | | | | | |
| $k/k_{ref}$: 25.12exp(-150±1200/T) | | | | | | |
| $CH_3COCOCH_2CH_3 + CH_3CH_2. \rightarrow CH_3COCOCH(.)CH_3 + CH_3CH_3$ | | | | | | |
| 2,3-PENTANEDIONE + ETHYL FREE RADICAL | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 4.5 | 362-398 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3COCOCH_2CH_3 + CH_3CH_2. \rightarrow .CH_2COCOCH_2CH_3 + CH_3CH_3$ | | | | | | |
| $CH_3COCOCH_2CH_3 + CH_3CH_2. \rightarrow CH_3COCOCH_2CH_2. + CH_3CH_3$ | | | | | | |
| 2,3-PENTANEDIONE + ETHYL FREE RADICAL | | | | | | |
| 74 SCH/KNO REACTION ORDER: 2 $k/k_{ref}$: 0.3 | 362-398 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3COCOCH_2CH_3 + CH_3CH_2. \rightarrow .CH_2COCOCH_2CH_3 + CH_3CH_3$ | | | | | | |
| $CH_3COCOCH_2CH_3 + CH_3CH_2. \rightarrow .CH_2COCOCH_2CH_3 + CH_3COCOCH(.)CH_3 + CH_3COCOCH_2CH_2. + CH_3CH_3$ | | | | | | |
| 2,3-PENTANEDIONE + ETHYL FREE RADICAL | | | | | | |
| 74 SCP/KNO REACTION ORDER: 2 | 362-398 | - | - | - | 0.2 | 6.3 |
| NOTE: $k_{ref}$: $CH_3COCOCH_2CH_3 + CH_3CH_2. \rightarrow CH_3C(O). + CH_3CH_2COCH_2CH_3$; $k/k_{ref}$: 50.12exp(-1410±1160/T) | | | | | | |
| $CH_3CH_2OCH_2CH=CH_2 \rightarrow CH_3CHO + CH_3CH=CH_2$ | | | | | | |
| 1-PROPENE, 3-ETHOXY | | | | | | |
| 74 EGG/VIT2 REACTION ORDER: 1 | 560-648 | 6.9(+11) | 0 | 21930±390 | 0.5 | 1.9 |
| $CH_3CH_2CH_2OCH=CH_2 \rightarrow CH_3CH=CH_2 + CH_3CHO$ | | | | | | |
| PROPANE, 1-(ETHENYLOXY)- | | | | | | |
| 74 EAM REACTION ORDER: 1 | 653-708 | 1.4(+11) | 0 | 22240±140 | 0.8 | 1.2 |
| $CH_3CD_2COCD_2CH_3 + CH_3 \rightarrow .CH_2CD_2COCD_2CH_3 + CH_4$ | | | | | | |
| 3-PENTANONE-2,2,4,4-$d_4$ + METHYL FREE RADICAL | | | | | | |
| 72 SCH/WOL1 REACTION ORDER: 2 | 513-572 | 2.0(+11) | 0 | 5540±450 | 0.3 | 3.2 |
| $CH_3CD_2COCD_2CH_3 + CH_3 \rightarrow CH_3CD(.)COCD_2CH_3 + CH_3D$ | | | | | | |
| 3-PROPANONE-2,2,4,4-$d_4$ + METHYL FREE RADICAL | | | | | | |
| 72 SCH/WOL1 REACTION ORDER: 2 | 513-572 | 1.3(+11) | 0 | 4180±200 | 0.6 | 1.8 |
| $CH_3OCH_2CH_2OCH=CH_2 \rightarrow CH_3OCH=CH_2 + CH_3CHO$ | | | | | | |
| ETHENE, (2-METHOXY ETHOXY)- | | | | | | |
| 74 EAM REACTION ORDER: 1 | 653-708 | 3.8(+10) | 0 | 20990±120 | 0.8 | 1.2 |
| $CH_3COOCH_2CH_2CH_3 \rightarrow CH_3COOH + CH_3CH=CH_2$ | | | | | | |
| ACETIC ACID PROPYL ESTER | | | | | | |
| 76 EEB/TAY REACTION ORDER: 1 | 650-700 | 4.5(+12) | 0 | 24410 | | |
| $CH_3COOCH_2CH_2CH_3 + OH \rightarrow$ products | | | | | | |
| ACETIC ACID PROPYL ESTER + HYDROXYL FREE RADICAL | | | | | | |
| 77 WIN/LLO REACTION ORDER: 2 | 305 | 2.6(+12) | - | - | 0.8 | 1.2 |
| $CH_3COOCH(CH_3)_2 \rightarrow CH_3COOH + CH_3CH=CH_2$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| ACETIC ACID 1-METHYL ETHYL ESTER<br>75 TAY REACTION ORDER: 1<br>77 SMI/MUT | 609-668<br>651 | 1.6(+13)<br>5.9(-3) | 0<br>- | 22900±350<br>- | 0.6<br>0.9 | 1.6<br>1.1 |
| $(CH_3)_3CCOOH + CH_2{=}C{=}O \rightarrow (CH_3)_3CC(O)OC(O)CH_3$<br>PROPANOIC ACID, 2,2-DIMETHYL-, + ETHENONE<br>76 BLA/VAY REACTION ORDER: 2 | 368-489 | 1.5(+9) | 0 | 5750±100 | 0.8 | 1.3 |
| $CH_3COOCH_2CH_2OCH_3 \rightarrow CH_3COOH + CH_2{=}CHOCH_3$<br>ETHANOL, 2-METHOXY-, ACETATE<br>76 DEB/TAY REACTION ORDER: 1 | 650-700 | 7.9(+12) | 0 | 25770 | | |
| $CH_3CH_2OCOOCH_2CH_3 \rightarrow CH_3CH_2OH + CO_2 + CH_2{=}CH_2$<br>CARBONIC ACID DIETHYL ESTER<br>72 BIG/WRE1 REACTION ORDER: 1 | 554-594 | 1.4(+13) | 0 | 23350 | | |
| NOTE: k DETERMINED BY SEALED-TUBE METHOD | 668-703 | 4.0(+13) | 0 | 23755 | 0.9 | 1.1 |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD<br>76 CKO/HUN | 584-663 | 1.1(+13) | 0 | 23455 | | |
| $HOCH_2COOCH(CH_3)_2 \rightarrow HOCH_2COOH + CH_3CH{=}CH_2$<br>ACETIC ACID, HYDROXY-, 1-METHYLETHYL ESTER<br>77 CHU/MAR REACTION ORDER: 1 | 563-623 | 3.6(+12) | 0 | 21640±350 | 0.5 | 1.2 |
| $(CH_3)_3CCH_2CO. \rightarrow (CH_3)_2C(CH_2OOH)CH_2.$<br>PROPYLDIOXY, 2,2-DIMETHYL-, FREE RADICAL<br>75 EAK/BAL REACTION ORDER: 1<br>NOTE: ESTIMATED K | 753 | 1.9(+4) | - | - | | |
| $(CH_3)_3CCH_2CO. \rightarrow (CH_3)_2C(.)CH_2OOCH_3$<br>PROPYLDIOXY, 2,2-DIMETHYL-, FREE RADICAL<br>75 EAK/BAL REACTION ORDER: 1<br>NOTE: UPPER LIMIT ESTIMATE | 753 | 1.6(+3) | - | - | | |
| $(CH_3)_2C(CH_2OOH)CH_2. \rightarrow cy\text{-}CH_2C(CH_3)_2CH_2O + OH$<br>PROPYL, 2-METHYL-2-HYDROPEROXY METHYL-, FREE RADICAL<br>75 EAK/BAL REACTION ORDER: 1<br>NOTE: ESTIMATED k | 753 | 1.0(+6) | - | - | 0.5 | 2.0 |
| $(CH_3)_2C(CH_2OOH)CH_2OO. \rightarrow (CH_3)_2CO + HCHO + HCHO + OH$<br>PROPYLDIOXY, 2-METHYL-2-HYDROPEROXYMETHYL-, FREE RADICAL<br>75 EAK/BAL REACTION ORDER: 1<br>NOTE: ESTIMATED k | 753 | 1.5(+6) | - | - | 0.5 | 2.0 |
| $(CH_3)_3COCH_3 \rightarrow (CH_3)_2C{=}CH_2 + CH_3OH$<br>PROPANE, 2-METHOXY-2-METHYL-<br>74 CHO/GOL REACTION ORDER: 1<br>NOTE: RECOMMENDED k FOR T=800K, BUT ARRHENIUS PLOT DETERMINED EXPERIMENTALLY OVER 780-917 k RANGE | 800 | 7.9(+13) | 0 | 29695±500 | | |
| $(CH_3)_2CHCH_2CN \rightarrow (CH_3)_2CH. + .CH_2CN$<br>BUTANENITRILE, 3-METHYL-<br>75 KIN/GOD2 REACTION ORDER: 1 | 1011-1123 | 2.5(+15) | 0 | 37100±850 | 0.5 | 1.1 |
| $(CH_3)_3CCN \rightarrow (CH_3)_2C{=}CH_2 + HCN$<br>PROPANENITRILE, 2,2-DIMETHYL-<br>73 EAS/EMO REACTION ORDER: 1<br>76 KIN/GOD | 838-927<br>1023-1254 | 1.6(+12)<br>1.3(+14) | 0<br>0 | 32055±245<br>37290±800 | 0.9<br>0.5 | 1.1<br>2.0 |
| $(CH_3)_3CCN \rightarrow (CH_3)_2C(.)CN + CH_3$<br>PROPANENITRILE, 2,2-DIMETHYL-<br>76 KIN/GOD REACTION ORDER: 1 | 1023-1254 | 7.9(+15) | 0 | 37700±800 | 0.5 | 2.0 |
| $(CH_3)_3CC{\equiv}CH \rightarrow (CH_3)_2C(.)C{\equiv}CH + CH_3$<br>1-BUTYNE, 3,3-DIMETHYL-<br>77 KIN REACTION ORDER: 1 | 933-1182 | 6.3(+5) | 0 | 35630±750 | 0.5 | 2.0 |
| $cis\text{-}CH_3CH{=}CH{=}CH{=}CHCH_3 \rightarrow trans\text{-}CH_3CH{=}CH{=}CH{=}CHCH_3$<br>cis-2,3,4 HEXATRIENE<br>76 ROT/EXN REACTION ORDER: 1 | 377-426 | 1.1(+13) | 0 | 16000±150 | | |
| $CH_2{=}CHCH_2CH_2CH{=}CH_2 \rightarrow$ products | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 1,5-HEXADIENE<br>75 SAK/NGH REACTION ORDER: 1 | 853-973 | 7.9(+12) | 0 | 27680 | | |
| $.CH_2CH_2CH_2CH_2CH{=}CH_2^{\#} \rightarrow .CH_2CH{=}CH_2 + CH_3CH{=}CH_2$<br>5-HEXENYL FREE RADICAL<br>75 TAR REACTION ORDER: 1 $k/k_{ref}$: 8.95 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C(.)CH_2CH_3^{\#} \rightarrow (CH_3)_2C{=}CH_2 + CH_3.$ | | | | | | |
| $CH_3CH_2CH_2CH_2CH{=}CH_2 \rightarrow$ products<br>1-HEXENE<br>71 MAG/IGA REACTION ORDER: 1 | 823-923 | 2.0(+12) | 0 | 25670 | | |
| $CH_3CH_2CH_2CH_2CH{=}CH_2 + O_3 \rightarrow$ products<br>1-HEXENE + OZONE<br>72 COX/PEN REACTION ORDER: 2 | 295 | 8.2(+6) | - | - | | |
| 72 COX/PEN | 295 | 7.2(+6) | - | - | | |
| NOTE: IN $N_2$ ATMOSPHERE | | | | | | |
| 73 STE/WU | 299 | 6.6(+6) | - | - | 0.9 | 1.1 |
| 74 JAP/WU | 298 | 6.7(+6) | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2CH_2CH{=}CH_2 + NO_2 \rightarrow [CH_3CH_2CH_2CH_2CH{=}CH_2.NO_2^{\ominus}$<br>1-HEXENE + NITROGEN OXIDE ($NO_2$)<br>75 GRY/ROZ REACTION ORDER: 2 | 293-333 | 7.7(+7) | 0 | 3520 | | |
| $CH_3CH_2CH_2CH_2CH{=}CH_2 + CH_3C(O)OO. \rightarrow cy\text{-}(CH_3CH_2CH_2CH_2)CHCH_2O + CH_3. + CO_2$<br>1-HEXENE + ETHYLDIOXY, 1-OXO-, FREE RADICAL<br>77 DIA/WAD REACTION ORDER: 2 | 393 | 2.2(+7) | - | - | 0.6 | 1.4 |
| $CH_3CH_2CH_2CH_2CH{=}CH_2 + CH_3C(O)OOH \rightarrow cy\text{-}(CH_3CH_2CH_2CH_2)CHCH_2O + CH_3COOH$<br>1-HEXENE + ETHANEPEROXOIC ACID<br>77 DIA/WAD REACTION ORDER: 2 | 393 | 2.1(+1) | - | - | 0.4 | 1.6 |
| $cis\text{-}CH_3CH_2CH_2CH{=}CHCH_3 \rightarrow trans\text{-}CH_3CH_2CH_2CH{=}CHCH_3$<br>cis-2-HEXENE<br>74 EAV/YAD REACTION ORDER: 1 $k/k_{ref}$: 1.0 | 1000-1150 | - | - | - | | |
| NOTE: $k_{ref}$: $cis\text{-}CH_3CH{=}CHCH_3 \rightarrow trans\ CH_3CH{=}CHCH_3$ | | | | | | |
| $CH_3CH_2CH_2C(CH_3){=}CH_2 + O_3 \rightarrow$ products<br>1-PENTENE, 2-METHYL-, + OZONE<br>72 COX/PEN REACTION ORDER: 2 | 295 | 1.0(+7) | - | - | | |
| $CH_3CH_2CH_2C(CH_3){=}CH_2 + H \rightarrow CH_3CH_2CH_2C(.)(CH_3)_2$<br>1-PENTENE, 2-METHYL-, + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 4.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_2C(CH_3){=}CH_2 + H \rightarrow CH_3CH_2CH_2CH(CH_3)CH_2.$ | | | | | | |
| $CH_3CH_2CH_2C(CH_3){=}CH_2 + H \rightarrow CH_3CH_2CH_2C(.)(CH_3)_2 + CH_3CH_2CH_2CH(CH_3)CH_2.$<br>1-PENTENE, 2-METHYL-, + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 8.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_2C(CH_3){=}CH_2 + H \rightarrow CH_3CH_2CH(.)C(CH_3){=}CH_2 + .CH_2CH_2CH_2C(CH_3){=}CH_2 + CH_3CH_2CH_2C(CH_2.){=}CH_2 + H_2$ | | | | | | |
| $CH_3CH_2CH_2C(CH_3){=}CH_2 + CH_3 \rightarrow CH_3CH_2CH_2C(.)(CH_3)CH_2CH_3$<br>1-PENTENE, 2-METHYL-, + METHYL FREE RADICAL<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 5.0 | 923 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH_2CH_2C(CH_3){=}CH_2 + CH_3 \rightarrow CH_3CH_2CH_2C(CH_3)_2CH_2. + CH_4$ | | | | | | |
| $CH_3CH_2CH_2C(CH_3){=}CH_2 + CH_3 \rightarrow CH_3CH_2CH_2C(.)(CH_3)CH_2CH_3 + CH_3CH_2CH_2C(CH_3)_2CH_2.$<br>1-PENTENE, 2-METHYL-, + METHYL FREE RADICAL | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 0.6<br>NOTE: $k_{ref}$: $CH_3CH_2CH_2C(CH_3)=CH_2 + CH_3 \rightarrow CH_3CH_2CH(.)C(CH_3)=CH_2 + .CH_2CH_2CH_2C(CH_3)=CH_2 + CH_3CH_2CH_2C(CH_2.)=CH_2 + CH_4$ | 923 | - | - | - | | |
| $(CH_3)_2CHCH_2CH=CH_2 + O_3 \rightarrow$ products<br>1-PENTENE, 4-METHYL-, + OZONE<br>72 COX/PEN REACTION ORDER: 2 | 295 | 6.4(+6) | - | - | | |
| $CH_3CH_2CH=C(CH_3)_2 + O_2^*(^1\Delta_g) \rightarrow CH_3CH=CH(CH_3)_2OOH + CH_3CH_2CH(OOH)C(CH_3)=CH_2$<br>2-PENTENE, 2-METHYL-, + OXYGEN MOLECULE<br>72 HUI/HER REACTION ORDER: 2<br>NOTE: GIVEN WITH CAUTION | 298 | 9.0(+6) | - | - | | |
| $CH_3CH_2CH=C(CH_3)_2 + H \rightarrow CH_3CH_2CH_2C(.)(CH_3)_2$<br>2-PENTENE, 2-METHYL-, + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: $CH_3CH_2CH=C(CH_3)_2 + H \rightarrow CH_3CH_2CH(.)CH(CH_3)_2$ | 923 | - | - | - | | |
| $CH_3CH_2CH=C(CH_3)_2 + H \rightarrow CH_3CH_2CH_2C(.)(CH_3)_2 + CH_3CH_2CH(.)CH(CH_3)_2$<br>2-PENTENE, 2-METHYL-, + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: $CH_3CH_2CH=C(CH_3)_2 + H \rightarrow CH_3CH_2CH=C(CH_3)CH_2. + CH_3CH(.)CH=C(CH_3)_2 + H_2$ | 923 | - | - | - | | |
| $CH_3CH_2CH=C(CH_3)_2 + CH_3 \rightarrow CH_3CH_2CH(CH_3)C(.)(CH_3)_2$<br>2-PENTENE, 2-METHYL-, + METHYL FREE RADICAL<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 1.0<br>NOTE: $k_{ref}$: $CH_3CH_2CH=C(CH_3)_2 + CH_3 \rightarrow CH_3CH_2CH(.)C(CH_3)_3$ | 923 | - | - | - | | |
| $CH_3CH_2CH=C(CH_3)_2 + CH_3 \rightarrow CH_3CH_2CH(CH_3)C(.)(CH_3)_2 + CH_3CH_2CH(.)C(CH_3)_3$<br>2-PENTENE, 2-METHYL-, + METHYL FREE RADICAL<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 0.12<br>NOTE: $k_{ref}$: $CH_3CH_2CH=C(CH_3)_2 + CH_3 \rightarrow CH_3CH_2CH=C(CH_3)CH_2. + CH_3CH(.)CH=C(CH_3)_2 + CH_4$ | 923 | - | - | - | | |
| $CH_3CH_2C(CH_3)=CHCH_3 + H \rightarrow CH_3CH_2C(.)(CH_3)CH_2CH_3$<br>2-PENTENE, 3-METHYL-, + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: $CH_3CH_2C(CH_3)=CHCH_3 + H \rightarrow CH_3CH_2CH(CH_3)CH(.)CH_3$ | 923 | - | - | - | | |
| $CH_3CH_2C(CH_3)=CHCH_3 + H \rightarrow CH_3CH_2C(.)(CH_3)CH_2CH_3 + CH_3CH_2CH(CH_3)CH(.)CH_3$<br>2-PENTENE, 3-METHYL-, + HYDROGEN ATOM<br>74 SHI/AMA REACTION ORDER: 2 $k/k_{ref}$: 3.0<br>NOTE: $k_{ref}$: $CH_3CH_2C(CH_3)=CHCH_3 + H \rightarrow CH_3CH_2C(CH_3)=CHCH_2. + CH_3CH(.)C(CH_3)=CHCH_3 + CH_3CH_2C(CH_2.)=CHCH_3 + H_2$ | 923 | - | - | - | | |
| cis-$CH_3CH_2C(CH_3)=CHCH_3 + O_3 \rightarrow$ products<br>cis-2-PENTENE, 3-METHYL-, + OZONE<br>74 JAP/WU REACTION ORDER: 2 | 298 | 2.7(+8) | - | - | 0.9 | 1.1 |
| trans-$CH_3CH_2C(CH_3)CHCH_3 + O_3 \rightarrow$ products<br>trans-2-PENTENE, 3-METHYL-, + OZONE<br>74 JAP/WU REACTION ORDER: 2 | 298 | 3.4(+8) | - | - | 0.9 | 1.1 |
| $(CH_3)_2C=C(CH_3)_2 + O \rightarrow$ cy-$[(CH_3)_2]CC[(CH_3)_2]O$ .<br>2-BUTENE, 2,3-DIMETHYL-, + OXYGEN ATOM<br>74 FUR/AIK REACTION ORDER: 2 | 298 | 4.4(+13) | - | - | 0.9 | 1.1 |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $(CH_3)_2C{=}C(CH_3)_2 + O \rightarrow cy\text{-}[(CH_3)_2CHCH(CH_3)_2]O$ | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + OXYGEN ATOM | | | | | | |
| 73 DAV/HUI REACTION ORDER: 2 | 298-355 | 3.4(+12) | 0 | -790±60 | 0.8 | 1.2 |
| $(CH_3)_2C{=}C(CH_3)_2 + O \rightarrow$ products | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + OXYGEN ATOM | | | | | | |
| 75 SIN/FUR REACTION ORDER: 2 | 298-481 | 1.2(+13) | 0 | -390±38 | 0.9 | 1.1 |
| $(CH_3)_3C{=}C(CH_3)_2 + O_2^*(^1\Delta_g) \rightarrow CH_2{=}C(CH_3)C(CH_3)_2OOH$ | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + OXYGEN MOLECULE | | | | | | |
| 72 ACK/PIT REACTION ORDER: 2 | 298 | 4.9(+8) | - | - | 0.9 | 1.1 |
| NOTE: FOR PRESSURES> 3 TORR | | | | | | |
| 73 HUI/HER | 298 | 7.6(+8) | - | - | | |
| 75 ASB/OGR | 300-500 | 1.3(+11) | 0 | 1625±75 | 0.8 | 1.2 |
| 76 DUM | 298 | 2.0(+7) | - | - | | |
| $(CH_3)_2C{=}C(CH_3)_2 + O_3 \rightarrow$ products | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + OZONE | | | | | | |
| 74 JAP/WU REACTION ORDER: 2 | 298 | 9.1(+8) | - | - | 0.9 | 1.1 |
| 75 HUI/HER | 227-363 | 1.7(+9) | 0 | 294±196 | 0.6 | 1.7 |
| NOTE: IN 0.0075 TORR. OF $O_2$ AS SCAVENGER. | | | | | | |
| $(CH_3)_2C{=}C(CH_3)_2 + H + M \rightarrow (CH_3)_2C(.)CH(CH_3)_2 + M$ | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + HYDROGEN ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 7.0(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.7 to 1.3 TORR. He PRESSURE. | | | | | | |
| $(CH_3)_2C{=}C(CH_3)_2 + D + M \rightarrow (CH_3)_2C(.)CD(CH_3)_2 + M$ | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + DEUTERIUM ATOM | | | | | | |
| 71 DAB/NIK REACTION ORDER: 2 M: He | 298 | 8.6(+11) | - | - | 0.9 | 1.1 |
| NOTE: 0.6 to 2.6 TORR. He PRESSURE. | | | | | | |
| $(CH_3)_2C{=}C(CH_3)_2 + OH \rightarrow$ products | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 71 MCK/NIK2 REACTION ORDER: 2 $k/k_{ref}$: 9.0 | 300 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3CH{=}CH_2 + OH \rightarrow$ products | | | | | | |
| $(CH_3)_2C{=}C(CH_3)_2 + S \rightarrow cy\text{-}[(CH_3)_2CC(CH_3)_2]S$ | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + SULFUR ATOM | | | | | | |
| 71 CEN/VAN REACTION ORDER: 2 | 298 | 6.2(+13) | - | - | 0.9 | 1.1 |
| NOTE: LOWER LIMIT k. FLASH PHOTOLYSIS METHOD. | | | | | | |
| 71 STR/O'C | 298-450 | - | - | - | | |
| NOTE: $k/k_{ref}$: 0.5 exp(+1690/T); $k_{ref}$: $CH_2{=}CH_2 + S \rightarrow$ | | | | | | |
| $cy\text{-}CH_2CH_2S$ | | | | | | |
| CONVENTIONAL PHOTOLYSIS METHOD | | | | | | |
| $(CH_3)_2C{=}C(CH_3)_2 + cis\text{-}NH{=}NH \rightarrow (CH_3)_2CHCH(CH_3)_2 + N_2$ | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + cis-DIAZENE | | | | | | |
| 74 VID/WIL REACTION ORDER: 2 $k/k_{ref}$: 0.02 | 373 | - | - | - | 0.5 | 1.5 |
| NOTE: $k_{ref}$: $CH_2{=}CH_2 + cis\text{-}NH{=}NH \rightarrow CH_3CH_3 + N_2$. | | | | | | |
| APPROXIMATE RATIO | | | | | | |
| $(CH_3)_2C{=}C(CH_3)_2 + S \rightarrow$ products | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + SULFUR ATOM | | | | | | |
| 73 DAV/KLE REACTION ORDER: 2 | 252-500 | 2.8(+12) | 3 | -650±115 | 0.6 | 1.4 |
| $(CH_3)_2C{=}C(CH_3)_2 + NO_3 \rightarrow$ products | | | | | | |
| 2-BUTENE, 2,3-DIMETHYL-, + NITROGEN OXIDE ($NO_3$) | | | | | | |
| 75 JAP/NIK REACTION ORDER: 2 | 300 | 2.2(+13) | - | - | 0.9 | 1.1 |
| $cis\text{-}CH_3CH(.)CH(CH_3)CH_2CH_2\cdot \rightarrow trans\text{-}CH_3CH(.)CH(CH_3)CH_2CH_2\cdot$ | | | | | | |
| cis-1,4-BUTANEDIYL, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 2 $k/k_{ref}$: 1.36 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $cis\text{-}CH_3CH(.)CH(CH_3)CH_2CH_2\cdot \rightarrow$ | | | | | | |
| $cis\text{-}cy\text{-}[CH(CH_3)CH(CH_3)CH_2CH_2]$ | | | | | | |
| $cis\text{-}CH_3CH(.)CH(CH_3)CH_2CH_2\cdot \rightarrow cis\text{-}cy\text{-}[CH(CH_3)CH(CH_3)CH_2CH_2]$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| cis-1,4 BUTANEDIYL, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 1 $k/k_{ref}$: 0.87 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → cis-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ | | | | | | |
| ---------- | | | | | | |
| cis-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → cis-cy-$[CH(CH_3)CH(CH_3)CH_2CH_2]$ | | | | | | |
| cis-1,4-BUTANEDIYL, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 1 $k/k_{ref}$: 0.29 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → products | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → trans-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ | | | | | | |
| trans-1,4-BUTANEDIYL, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 1 $k/k_{ref}$: 1.61 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-$CH_3CH(.)CH(CH_3)CH_2CH_2$ → cis-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → cis-$CH_3CH(.)CH(CH_3CH_2CH_2.$ | | | | | | |
| trans-1,4-BUTANEDIYL, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 1 $k/k_{ref}$: 0.7 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → trans-cy-$[CH(CH_3)CH(CH_3)CH_2CH_2]$ | | | | | | |
| ---------- | | | | | | |
| trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → trans-cy-$[CH(CH_3)CH(CH_3)CH_2CH_2]$ | | | | | | |
| trans-1,4-BUTANEDIYL, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 1 $k/k_{ref}$: 0.72 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → trans-$CH_3CH{=}CHCH_3$ + $CH_2{=}CH_2$ | | | | | | |
| $k/k_{ref}$: 0.32 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ → products | | | | | | |
| ---------- | | | | | | |
| trans-cy-$[CH(CH_3)CH(CH_3)CH_2CH_2]$ → trans-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ | | | | | | |
| trans-CYCLOBUTANE, 1,2-DIMETHYL- | | | | | | |
| 77 SCA/BAC REACTION ORDER: 1 $k/k_{ref}$: 0.58 | 663-703 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: cis-cy-$[CH(CH_3)CH(CH_3)CH_2CH_2]$ → cis-$CH_3CH(.)CH(CH_3)CH_2CH_2.$ | | | | | | |
| ---------- | | | | | | |
| $CH_3CH(.)CH_2CH_2CH_2CH_3^*$ → $CH_3CH{=}CH_2$ + $CH_3CH_2CH_2.$ | | | | | | |
| PENTYL, 1-METHYL-, FREE RADICAL | | | | | | |
| 75 TAR REACTION ORDER: 1 $k/k_{ref}$: 0.49 | 298 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C(.)CH_2CH_3^*$ → $(CH_3)_2C{=}CH_2$ + $CH_3.$ | | | | | | |
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3$ → products | | | | | | |
| HEXANE | | | | | | |
| 73 ILL/WEL REACTION ORDER: 1 | 870-1025 | 2.3(+12) | 0 | 26520 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3$ + OH → $[.C_6H_{13}]$ + $H_2O$ | | | | | | |
| HEXANE + HYDROXYL FREE RADICAL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 3.3(+12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3$ + M → products | | | | | | |
| HEXANE | | | | | | |
| 76 RYB/YAM REACTION ORDER: 1 M: Ar | 973-1083 | 3.6(+10) | 0 | 23150 | | |
| 76 RYB/YAM M: $D_2$ | 973-1083 | 1.6(+10) | 0 | 22145 | | |
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3$ + OH → products | | | | | | |
| HEXANE + HYDROXYL FREE RADICAL | | | | | | |
| 76 LIO/DAR REACTION ORDER: 2 | 305 | 3.8(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3$ + $CH_3.$ → $[C_6H_{13}.]$ + $CH_4$ | | | | | | |
| HEXANE + METHYL FREE RADICAL | | | | | | |
| 76 YAM REACTION ORDER: 2 | 973-1088 | 4.2(+12) | 0 | 5640 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3 + CH_3CH_2. \rightarrow [C_6H_{13}.] + CH_3CH_3$ | | | | | | |
| HEXANE + ETHYL FREE RADICAL | | | | | | |
| 76 YAM REACTION ORDER: 2 | 973-1088 | 1.8(+13) | 0 | 8050 | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH_2CH_2CH_3 \rightarrow$ products | | | | | | |
| PENTANE, 2-METHYL- | | | | | | |
| 73 ILL/WEL REACTION ORDER: 1 | 853-1053 | 1.0(+14) | 0 | 29910 | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CH_3)_2CHCH_2CH_2CH_3 + OH \rightarrow$ products | | | | | | |
| PENTANE, 2-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 ILE/DAR2 REACTION ORDER: 2 | 305 | 3.2(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $CH_3CH_2CH(CH_3)CH_2CH_3 + OH \rightarrow$ products | | | | | | |
| PENTANE, 3-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 ILE/DAR2 REACTION ORDER: 2 | 305 | 4.3(+12) | - | - | 0.8 | 1.2 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3CCH_2CH_3 \rightarrow$ products | | | | | | |
| BUTANE, 2,2-DIMETHYL- | | | | | | |
| 73 ILL/WEL REACTION ORDER: 1 | 898-1053 | 4.6(+13) | 0 | 30190 | | |
| ---------- | | | | | | |
| $CH_3(CH_2)_4CH_3 + OH \rightarrow [.C_6H_{13}] + H_2O$ | | | | | | |
| HEXANE + HYDROXYL FREE RADICAL | | | | | | |
| 76 CAM/MCL REACTION ORDER: 2 | 292 | 3.3(12) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 \rightarrow (CH_3)_2CH. + (CH_3)_2CH.$ | | | | | | |
| BUTANE, 2,3-DIMETHYL | | | | | | |
| 74 GEL/ALF REACTION ORDER: 1 | 990-1250 | 2.5(+16) | 0 | 37540 | | |
| NOTE: BEST FIT OF EXPERIMENTAL DATA | | | | | | |
| TO log A=16.4 FOR EACH C-C FISSION. | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 + OH \rightarrow$ products | | | | | | |
| BUTANE, 2,3-DIMETHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 DAR/WIN REACTION ORDER: 2 $k/k_{ref}$: 0.1 | 305 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2 + OH \rightarrow$ products | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 + HO_2 \rightarrow (CH_3)_2CHC(.)(CH_3)_2 + H_2O_2$ | | | | | | |
| BUTANE, 2,3-DIMETHYL-, + HYDROPEROXYL FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 373 | 2.5(+5) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 + CH_3O. \rightarrow (CH_3)_2CHC(.)(CH_3)_2 + CH_3OH$ | | | | | | |
| BUTANE, 2,3-DIMETHYL-, + METHOXY FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 373 | 4.0(+8) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 + CH_3O_2. \rightarrow (CH_3)_2CHC(.)(CH_3)_2 + CH_3OOH$ | | | | | | |
| BUTANE, 2,3-DIMETHYL-, + METHYLDIOXY FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 373 | 1.6(+5) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 + (CH_3)_2CHC(O.)(CH_3)_2 \rightarrow (CH_3)_2CHC(.)(CH_3)_2$ | | | | | | |
| $+ (CH_3)_2CHC(OH)(CH_3)_2$ | | | | | | |
| BUTANE, 2,3-DIMETHYL-, + PROPOXY, 1,1,2-TRIMETHYL-, | | | | | | |
| FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 376 | 4.0(+8) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH(CH_3)_2 + (CH_3)_2CH(O_2.)(CH_3)_2 \rightarrow (CH_3)_2CHC(.)(CH_3)_2$ | | | | | | |
| $+ (CH_3)_2CHC(OOH)(CH_3)_2$ | | | | | | |
| BUTANE, 2,3-DIMETHYL-, + PROPYLDIOXY, 1,1,2-TIMETHYL-, | | | | | | |
| FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 373 | 1.6(+5) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_3CCH_2CH_3^{*} \rightarrow CH_3 + CH_3CH_2. + (CH_3)C. + (CH_3)_2C(.)CH_2CH_3.$ | | | | | | |
| $+ (CH_3)_3CCH_2.$ | | | | | | |
| BUTANE, 2,2-DIMETHYL- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| 72 HAS/JOH REACTION ORDER: 1 | 298 | 4.6(+5) | - | - | 0.8 | 1.2 |
| NOTE: 0.017 TORR | 298 | 8.7(+5) | - | - | 0.9 | 1.1 |
| NOTE: 0.033 TORR | | | | | | |
| ---------- | | | | | | |
| $CH{\equiv}CC(CH_3)_2COOH \rightarrow CH_2{=}C{=}C(CH_3)_2 + CO_2$ | | | | | | |
| 3-BUTYNOIC ACID, 2,2-DIMETHYL- | | | | | | |
| 76 BIG/WEA REACTION ORDER: 1 | 500-630 | 2.3(+11) | 0 | 18395±760 | 0.4 | 2.6 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$ | | | | | | |
| ---------- | | | | | | |
| $CH_3COCH_2CH_2COCH_3 + CH_3 \rightarrow .CH_2COCH_2CH_2COCH_3$ | | | | | | |
| $+ CH_3CCCH(.)CH_2COCH_3 + CH_4$ | | | | | | |
| 2,5-HEXANEDIONE + METHYL FREE RADICAL | | | | | | |
| 75 KNO/SCH REACTION ORDER: 2 | 515-712 | - | - | - | | |
| NOTE: $k_{ref}$: $CH_3COCH_2CH_2COCH_3 + CH_3. \rightarrow .CH_2CH_2COCH_3$ | | | | | | |
| $+ CH_3COCH_3$. $k/k_{ref}$: exp(+1630±10/T) | | | | | | |
| ---------- | | | | | | |
| $CH_3COCH_2CH(CH_3)_2 + OH \rightarrow$ products | | | | | | |
| 2-PENTANONE, 4-METHYL-, + HYDROXYL FREE RADICAL | | | | | | |
| 76 WIN/LIO REACTION ORDER: 2 | 305 | 9.0(+12) | - | - | 0.7 | 1.3 |
| NOTE: EVALUATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHCH_2OCH{=}CH_2 \rightarrow (CH_3)_2C{=}CH_2 + CH_3O$ | | | | | | |
| PROPANE, 1-(ETHENYLOXY)-2-METHYL- | | | | | | |
| 74 LAM REACTION ORDER: 1 | 653-708 | 1.3(+11) | 0 | 21400±200 | 0.7 | 1.3 |
| ---------- | | | | | | |
| $CH_3COOCH_2CH_2CH_2CH_3 \rightarrow CH_3COOH + CH_3CH_2CH{=}CH_2$ | | | | | | |
| ACETIC ACID BUTYL ESTER | | | | | | |
| 76 DIB/TAY REACTION ORDER: 1 | 650-700 | 4.0(+12) | 0 | 24210 | | |
| ---------- | | | | | | |
| $CH_3COOCH(CH_3)CH_2CH_3 + OH \rightarrow$ products | | | | | | |
| ACETIC ACID 1-METHYLPROPYL ESTER + HYDROXYL FREE RADICAL | | | | | | |
| 77 WIN/LIO REACTION ORDER: 2 | 305 | 3.4(+12) | - | - | 0.8 | 1.2 |
| ---------- | | | | | | |
| $CH_3COOC(CH_3)_3 \rightarrow CH_3COOH + (CH_3)_2C{=}CH_2$ | | | | | | |
| ACETIC ACID 1,1-DIMETHYLETHYL ESTER | | | | | | |
| 75 TAY REACTION ORDER: 1 | 557-609 | 2.0(+13) | 0 | 20280±175 | 0.8 | 1.3 |
| ---------- | | | | | | |
| $CH_3CH_2COOCH(CH_3)_2 \rightarrow CH_3CH_2COOH + CH_3CH{=}CH_2$ | | | | | | |
| PROPANOIC ACID 1-METHYLETHYL ESTER | | | | | | |
| 77 CHU/MAR REACTION ORDER: 1 | 563-623 | 1.1(+13) | 0 | 22850±100 | 0.8 | 1.2 |
| 77 SMI/MUT | 651 | 6.1(-3) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $(CH_3)_3CCH_2COOH + CH_2{=}C{=}O \rightarrow (CH_3)_3CCH_2C(O)OC(O)CH_3$ | | | | | | |
| BUTANOIC ACID, 3,3-DIMETHYL-, + ETHENONE | | | | | | |
| 76 EIA/VAY REACTION ORDER: 2 | 428 | 1.6(+3) | - | - | | |
| ---------- | | | | | | |
| $CH_3COOCH_2CH_2CH_2OCH_3 \rightarrow CH_3COOH + CH_2{=}CHCH_2OCH_3$ | | | | | | |
| 1-PROPANAL, 3-METHOXY-, ACETATE | | | | | | |
| 76 DIB/TAY REACTION ORDER: 1 | 650-700 | 4.5(+12) | 0 | 24410 | | |
| ---------- | | | | | | |
| $CH_3OCH_2COOCH(CH_3)_2 \rightarrow CH_3OCH_2COOH + CH_3CH{=}CH_2$ | | | | | | |
| ACETIC ACID, 2-METHOXY-, 1-METHYLETHYL ESTER | | | | | | |
| 77 SMI/MUT REACTION ORDER: 2 | 651 | 6.9(-3) | - | - | 0.9 | 1.1 |
| ---------- | | | | | | |
| $CH_3CH_2OC(O)OCH_2CH_2CH_3 \rightarrow CH_2{=}CH_2 + CH_3CH_2OH + CO_2$ | | | | | | |
| $+ CH_3CH{=}CH_2 + CH_3CH_2CH_2OH$ | | | | | | |
| CARBONIC ACID ETHYL PROPYL ESTER | | | | | | |
| 76 CRO/HUN REACTION ORDER: 1 | 581-664 | 7.8(+11) | 0 | 21845 | | |
| ---------- | | | | | | |
| $(CH_3)_2CHC(O.)(CH_3)_2 \rightarrow (CH_3)_2CH. + (CH_3)_2CO$ | | | | | | |
| PROPOXY, 1,1,2-TRIMETHYL-, FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 373 | 4.7(+6) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |
| $(CH_3)_2CHC(O.)(CH_3)_2 \rightarrow (CH_3)_2CHCOCH_3 + CH_3$ | | | | | | |
| PROPOXY, 1,1,2-TRIMETHYL-, FREE RADICAL | | | | | | |
| 75 ALC/MIL REACTION ORDER: 2 | 373 | 1.5(+8) | - | - | | |
| NOTE: OPTIMIZATION | | | | | | |
| ---------- | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $(CH_3)_2CHC(e.)(CH_3)_2 + O_2 \rightarrow$ products<br>PROPOXY, 1,1,2-TRIMETHYL-, FREE RADICAL + OXYGEN MOLECULE<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 1.2(+9) | - | - | | |
| $(CH_3)_2CHC(e.)(CH_3)_2 + (CH_3)_2CHCH(CH_3)_2 \rightarrow (CH_3)_2CHC(OH)(CH_3)_2 + (CH_3)_2CHC(.)(CH_3)_2$<br>PROPOXY, 1,1,2-TRIMETHYL-, FREE RADICAL + BUTANE, 2,3-DIMETHYL-<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 4.0(+8) | - | - | | |
| $(CH_3)_2CHC(e_2.)(CH_3)_2 + (CH_3)_2CHCH(CH_3)_2 \rightarrow (CH_3)_2CHC(OOH)(CH_3)_2 + (CH_3)_2CHC(.)(CH_3)_2$<br>PROPYLDIOXY, 1,1,2-TRIMETHYL-, FREE RADICAL + BUTANE, 2,3-DIMETHYL-<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 1.6(+5) | - | - | | |
| $(CH_3)_2CHC(e_2.)(CH_3)_2 + (CH_3)_2CHO_2. \rightarrow$ products<br>PROPYLDIOXY, 1,1,2-TRIMETHYL-, FREE RADICAL + ETHYLDIOXY, 1-METHYL-, FREE RADICAL<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 6.2(+11) | - | - | | |
| $(CH_3)_2CHC(e_2.)(CH_3)_2 + (CH_3)_2CHC(e_2.)(CH_3)_2 \rightarrow (CH_3)_2CHC(O.)(CH_3)_2 + (CH_3)_2CHC(O.)(CH_3)_2 + O_2$<br>PROPYLDIOXY, 1,1,2-TRIMETHYL-, FREE RADICAL<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 2.3(+11) | - | - | | |
| $(CH_3)_2CHC(e_2.)(CH_3)_2 + (CH_3)_2CHC(O_2.)(CH_3)_2 \rightarrow$ FRAGMENTATION PRODUCTS<br>PROPYLDIOXY, 1,1,2-TRIMETHYL-, FREE RADICAL<br>75 AIC/MIL REACTION ORDER: 2<br>NOTE: OPTIMIZATION | 373 | 2.4(+11) | - | - | | |
| $CH_3CH_2CH_2eCH_2CH_2CH_3 + OH \rightarrow$ products<br>PROPANE, 1,1'-OXYBIS-, + HYDROXYL FREE RADICAL<br>76 IIC/DAR REACTION ORDER: 2 | 305 | 1.0(+13) | - | - | 0.8 | 1.2 |
| $(CH_3)_2CHC(CH_3)_2OH \rightarrow (CH_3)_2CH. + .C(CH_3)_2OH$<br>2-BUTANOL, 2,3-DIMETHYL-<br>76 TSAI REACTION ORDER: 1 | 1080-1165 | 1.7(+16) | 0 | 18820 | | |
| $(CH_3)_2CHC(CH_3)_2OH \rightarrow (CH_3)_2CHC(CH_3)=CH_2 + H_2O$<br>2-BUTANOL, 2,3-DIMETHYL-<br>76 TSAI REACTION ORDER: 1 | 1080-1165 | 1.5(+14) | 0 | 16255 | | |
| $(CH_3)_2CHC(CH_3)_2OH \rightarrow (CH_3)_2C=C(CH_3)_2 + H_2O$<br>2-BUTANOL, 2,3-DIMETHYL-<br>76 TSAI REACTION ORDER: 1 | 1080-1165 | 4.6(+13) | 0 | 16455 | | |
| $(CH_3)_3CCH(CH_3)OH \rightarrow (CH_3)_3C. + CH_3CH(.)OH$<br>2-BUTANOL, 3,3-DIMETHYL-<br>76 TSAI REACTION ORDER: 1 | 990-1125 | 2.1(+16) | 0 | 18875 | | |
| $(CH_3)_3CCH(CH_3)OH \rightarrow (CH_3)_3CCH=CH_2 + H_2O$<br>2-BUTANOL, 3,3-DIMETHYL-<br>76 TSAI REACTION ORDER: 1 | 990-1125 | 1.0(+14) | 0 | 17210 | | |
| $CH_2=CHCH_2NHCH_2CH=CH_2 \rightarrow CH_3CH=CH_2 + CH_3=CHCH=NH$<br>2-PROPEN-1-AMINE, N-(2-PROPENYL)-<br>74 EGG/VITI REACTION ORDER: 1 | 533-616 | 1.1(+11) | 0 | 18676±166 | 0.7 | 1.3 |
| $(CH_3)_2C=CHN(CH_3)_2 + O_2^*(^1\Delta_g) \rightarrow CH_2=C(CH_3)CH(OOH)[N(CH_3)_2]$<br>1-PROPEN-1-AMINE, N,N,2-TRIMETHYL-, + OXYGEN MOLECULE<br>7[illegible] CI/HER REACTION ORDER: 2 | 298 | 1.5(+10) | - | - | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3CH_2CH_2CH_2CH_2N{=}NCH_3 + CH_3CH_2CH_2CH_2CH_2\cdot \rightarrow \cdot CH_2CH_2CH_2CH_2CH_2N{=}NCH_3 + CH_3CH_2CH_2CH_2CH_3$<br>DIAZINE, METHYLPENTYL-, + PENTYL FREE RADICAL<br>71 WAT — REACTION ORDER: 2 | 297-435 | 4.2(+11) | 0 | 3925 | | |
| $(CH_3)_2CHN{=}NCH(CH_3)_2 \rightarrow$ products<br>DIAZENE, BIS(1-METHYLETHYL)-<br>73 PER/BEA — REACTION ORDER: 1 | 625-830 | 4.0(+16) | 0 | 24100±500 | | |
| $CH_2{=}C{=}CHCH(CH_3)C{\equiv}CH \rightarrow CH{\equiv}CCH_2CH{=}C{=}CHCH_3$<br>1,2-HEXADIEN-5-YNE, 4-METHYL-<br>72 HEP — REACTION ORDER: 1 | 423-473 | 6.6(+10) | 0 | 15500±150 | 0.7 | 1.3 |
| $CH{\equiv}CCH_2CH(CH_3)CH_2CH_3 \rightarrow CH{\equiv}CCH_2\cdot + CH_3CH(\cdot)CH_2CH_3$<br>1-HEXYNE, 4-METHYL-<br>76 TSA2 — REACTION ORDER: 1 | 980-1210 | 7.9(+15) | 0 | 35030 | | |
| $CH{\equiv}CCH_2CH(CH_3)CH_2CH_3 \rightarrow CH_2{=}C{=}CH_2 + CH_2{=}CHCH_2CH_3$<br>1-HEXYNE, 4-METHYL-<br>76 TSA2 — REACTION ORDER: 1 | 980-1210 | 5.0(+12) | 0 | 27980 | | |
| $CH{\equiv}CCH_2CH_2CH(CH_3)_2 \rightarrow CH{\equiv}CCH_2\cdot + \cdot CH_2CH(CH_3)_2$<br>1-HEXYNE, 5-METHYL-<br>76 TSA2 — REACTION ORDER: 1 | 980-1210 | 2.0(+16) | 0 | 36940 | | |
| $CH{\equiv}CCH_2CH_2CH(CH_3)_2 \rightarrow CH_2{=}C{=}CH_2 + CH_2{=}C(CH_3)_2$<br>1-HEXYNE, 5-METHYL-<br>76 TSA2 — REACTION ORDER: 1 | 980-1210 | 2.0(+12) | 0 | 27380 | | |
| $syn\text{-}(CH_3)_3CCH{=}CHCH_2\cdot \rightarrow anti\text{-}(CH_3)_3CCH{=}CHCH_2\cdot$<br>SYN-2-PENTENYL, 4,4-DIMETHYL-, FREE RADICAL<br>76 SUS/BRA — REACTION ORDER: 1 | 253-295 | - | - | 5185±450 | | |
| $CH_3CH_2CH_2CH_2CH_2CH{=}CH_2 \rightarrow$ products<br>1-HEPTENE<br>74 MAG/IOA — REACTION ORDER: 1 | 823-923 | 3.5(+13) | 0 | 28335 | | |
| $cis\text{-}CH_3CH_2CH_2CH_2CH{=}CHCH_3 \rightarrow trans\text{-}CH_3CH_2CH_2CH_2CH{=}CHCH_3$<br>74 EAU/YAD — REACTION ORDER: 1 $k/k_{ref}$: 1.0<br>NOTE: $k_{ref}$: $cis\text{-}CH_3CH{=}CHCH_3 \rightarrow trans\text{-}CH_3CH{=}CHCH_3$ | 1000-1150 | - | - | - | | |
| $(CH_3)_2C{=}C(CH_3)CH_2CH_3 + O_2^*(^1\Delta_g) \rightarrow CH_2{=}C(CH_3)C(CH_2CH_3)(CH_3)OOH + CH_2{=}C(CH_2CH_3)C(CH_2)OOH$<br>2-PENTENE, 2,3-DIMETHYL-, + OXYGEN MOLECULE<br>73 HUI/HER — REACTION ORDER: 2 | 298 | 5.2(+8) | - | - | | |
| $CH_3CH_2CH_2CH_2CH_2CH{=}CH_2 + OH \rightarrow$ products<br>1-HEPTENE + HYDROXYL FREE RADICAL<br>76 DAR/WIN — REACTION ORDER: 2 $k/k_{ref}$: 0.73<br>NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2 + OH \rightarrow$ products | 305 | - | - | - | | |
| $(CH_3)_2CHCH_2C(\cdot)(CH_3)_2^* \rightarrow (CH_3)_2C{=}CH_2 + (CH_3)_2CH\cdot$<br>BUTYL, 1,1,3-TRIMETHYL-, FREE RADICAL<br>71 GEO/KAB — REACTION ORDER: 1 | 298 | 2.1(+7) | - | - | | |
| $(CH_3)_3CCH_2CH(\cdot)CH_3^* \rightarrow (CH_3)_3C\cdot + CH_3CH{=}CH_2$<br>BUTYL, 1,3,3-TRIMETHYL-, FREE RADICAL<br>71 GLE/RAB — REACTION ORDER: 1 | 298 | 1.7(+8) | - | - | | |
| $CH_3(CH_2)_5CH_3 \rightarrow$ products<br>HEPTANE<br>73 ILL/WEL — REACTION ORDER: 1<br>75 TAN/KRA | 873-1073<br>763-813 | 1.9(+12)<br>1.6(+10) | 0<br>0 | 26445<br>24660 | 0.9 | 1.1 |
| $CH_3(CH_2)_5CH_3 + O_2 \rightarrow [C_7H_{15}\cdot] + HO_2$<br>HEPTANE + OXYGEN MOLECULE<br>75 SHA/DEN — REACTION ORDER: 2 | 397-434 | 3.2(+17) | 0 | 21800±2000 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $(CH_3)_2CHCH_2CH(CH_3)_2$ → products<br>PENTANE, 2,4-DIMETHYL-<br>73 ILL/WEL REACTION ORDER: 1 | 873-1073 | 4.5(+14) | 0 | 31230 | 0.9 | 1.1 |
| $(CH_3)_3CCH(CH_3)_2$ + OH → products<br>BUTANE, 2,2,3-TRIMETHYL-, + HYDROXYL FREE RADICAL<br>76 DAR/WIN REACTION ORDER: 2 $k/k_{ref}$: 0.074 | 305 | - | - | - | | |
| NOTE: $k_{ref}$: $(CH_3)_2C{=}CH_2$ + OH → products | | | | | | |
| $CH_2{=}C{=}CHC(CH_3)_2COOH$ → $CH_2{=}CHCH{=}C(CH_3)_2$ + $CO_2$<br>3,4-PENTADIENOIC ACID, 2,2-DIMETHYL-<br>76 BIG/WEA2 REACTION ORDER: 1 | 500-695 | 1.7(+11) | 0 | 19455±760 | 0.4 | 2.6 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$. | | | | | | |
| trans-$CH_3CH{=}CHCOOCH(CH_3)_2$ → trans-$CH_3CH{=}CHCOOH$ + $CH_3CH{=}CH_2$<br>trans-2-BUTENOIC ACID 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 7.1(-3) | - | - | 0.9 | 1.1 |
| $CH_3COOCH_2CH_2CH_2COCH_3$ → $CH_3COOH$ + $CH_2{=}CHCH_2COCH_3$<br>2-PENTANONE, 5-ACETYLOXY-<br>76 DIB/TAY REACTION ORDER: 1 | 650-700 | 6.3(+12) | 0 | 23905 | | |
| $(CH_3)_2CHCOOCH(CH_3)_2$ → $(CH_3)_2CHCOOH$ + $CH_3CH{=}CH_2$<br>PROPANOIC ACID, 2-METHYL-, 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 6.8(-3) | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2COOCH(CH_3)_2$ → $CH_3CH_2CH_2COOH$ + $CH_3CH{=}CH_2$<br>BUTANOIC ACID 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 5.9(-3) | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2OCOOCH_2CH_2CH_3$ → $CH_3CH_2CH_2OH$ + $CO_2$ + $CH_3CH{=}CH_2$<br>CARBONIC ACID DIPROPYL ESTER<br>72 BIG/WRE1 REACTION ORDER: 1 | 663-708 | 4.0(+13) | 0 | 23755 | | |
| NOTE: k DETERMINED BY FLOW TUBE METHOD.<br>76 CHO/HUN | 583-667 | 9.3(+11) | 0 | 21890 | | |
| $(CH_3)_2CHOCOOCH(CH_3)_2$ → $(CH_3)_2CHOH$ + $CO_2$ + $CH_3CH{=}CH_2$<br>CARBONIC ACID BIS(1-METHYL ETHYL) ESTER<br>72 BIG/WRE2 REACTION ORDER: 1 | 593-648 | 2.2(+14) | 0 | 22800 | | |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD | | | | | | |
| $(CD_3)_2CHOCOOCH(CD_3)_2$ → $(CD_3)_2CHOH$ + $CO_2$ + $CD_3CH{=}CD_2$<br>CARBONIC ACID BIS(1-METHYL-$d_3$-ETHYL-2,2,2-$d_3$) ESTER<br>72 BIG/WRE2 REACTION ORDER: 1 | 593-648 | 2.4(+14) | 0 | 23400 | | |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD | | | | | | |
| $CH_3OCOOC(CH_3)_2CH_2CH_3$ → $CH_3OH$ + $CO_2$ + $CH_2{=}C(CH_3)CH_2CH_3$<br>+ $(CH_3)_2C{=}CHCH_3$<br>CARBONIC ACID 1,1-DIMETHYL PROPYL METHYL ESTER<br>72 BIG/WRE3 REACTION ORDER: 1 | 593-648 | 4.0(+12) | 0 | 17465 | | |
| NOTE: k DETERMINED BY FLOW TUBE METHOD. T RANGE ASSUMED.<br>T RANGE ASSUMED. (OMITTED IN TEXT). | | | | | | |
| cy-$(CH{=}CHCH_2CH_2CH{=}CHCH_2CH_2)$, (Z,Z) → $CH_2{=}CHCH{=}CH_2$ + $CH_2{=}CHCH{=}CH_2$<br>1,5-CYCLOOCTADIENE, (Z,Z)-<br>77 HUY/LUY REACTION ORDER: 1 | 464-557 | 2.9(+16) | 0 | 28375±50 | 0.9 | 1.1 |
| NOTE: (Z,Z) IS THE SYSTEMATIC NOTATION FOR<br>cis, cis CONFORMATION OF 1,5-CYCLOOCTADIENE | | | | | | |
| cy-$(CH{=}CHCH_2CH_2CH{=}CHCH_2CH_2)$, (Z,Z) →<br>cy-$[CH{=}CHCH_2CH(CH{=}CH_2)CH_2CH_2]$<br>1,5-CYCLOOCTADIENE, (Z,Z)-<br>77 HUY/LUY REACTION ORDER: 1 | 464-557 | 2.2(+15) | 0 | 26060±60 | 0.9 | 1.1 |
| NOTE: SEE PRECEDING NOTE. | | | | | | |
| $CH_3C{\equiv}CCH_2CH_2CH(CH_3)_2$ → $CH_3C{\equiv}CCH_2\cdot$ + $\cdot CH_2CH(CH_3)_2$<br>2-HEPTYNE, 6-METHYL-<br>SA2 REACTION ORDER: 1 | 980-1210 | 1.3(+16) | 0 | 36390 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | k factors F |
|---|---|---|---|---|---|---|
| $CH_3C{\equiv}CCH_2CH_2CH(CH_3)_2 \rightarrow CH_3CH{=}C{=}CH_2 + CH_2{=}C(CH_3)_2$ | | | | | | |
| 2-METHYL, 6-METHYL- | | | | | | |
| 76 TSA2 REACTION ORDER: 1 | 980-1210 | 3.2(+12) | 0 | 29590 | | |
| $CH_3CH_2CH(CH_3)CH_2C(CH_3){=}CH_2 \rightarrow CH_3CH_2CH{=}CH_2 + (CH_3)_2C{=}CH_2$ | | | | | | |
| 1-HEXENE, 2,4-DIMETHYL- | | | | | | |
| 73 TSA REACTION ORDER: 1 | 1050 | 3.2(+12) | 0 | 26900 | | |
| $CH_3CH_2CH(CH_3)CH_2C(CH_3){=}CH_2 \rightarrow CH_3CH_2CH(.)CH_3 + .CH_2C(CH_3){=}CH_2$ | | | | | | |
| 1-HEXENE, 2,4-DIMETHYL- | | | | | | |
| 73 TSA REACTION ORDER: 1 | 1050 | 4.0(+15) | 0 | 33200 | | |
| $(CH_3)_2C{=}C(CH_3)CH_2CH_2CH_3 + O_2^* \rightarrow$ | | | | | | |
| $CH_2{=}C(CH_3)C(CH_2CH_2CH_3)(CH_3)OOH + CH_2{=}C(CH_2CH_2CH_3)C(CH_3)_2OOH$ | | | | | | |
| 2-HEXENE, 2,3-DIMETHYL-, + OXYGEN MOLECULE | | | | | | |
| 73 BUI/HER REACTION ORDER: 2 | 298 | 5.0(+8) | - | - | | |
| $CH_3(CH_2)_6CH_3 \rightarrow$ products | | | | | | |
| OCTANE | | | | | | |
| 73 IIL/WEL REACTION ORDER: 1 | 873-1073 | 1.0(+12) | 0 | 26335 | 0.9 | 1.1 |
| $(CH_3)_2CH(CH_2)_4CH_3 \rightarrow$ products | | | | | | |
| HEPTANE, 2-METHYL- | | | | | | |
| 73 IIL/WEL REACTION ORDER: 1 | 873-1046 | 1.5(+13) | 0 | 28145 | 0.9 | 1.1 |
| $CH_3CH_2CH(CH_3)CH(CH_3)CH_2CH_3 \rightarrow CH_3CH_2CH(.)CH_3 + CH_3CH_2CH(.)CH_3$ | | | | | | |
| HEXANE, 3,4-DIMETHYL- | | | | | | |
| 72 TSA REACTION ORDER: 1 | 1051-1180 | 2.2(+16) | 0 | 37900 | | |
| $(CH_3)_3CCH(CH_3)CH_2CH_3 \rightarrow (CH_3)_3C. + CH_3CH_2CH(.)CH_3$ | | | | | | |
| PENTANE, 2,2,3-TRIMETHYL- | | | | | | |
| 72 TSA REACTION ORDER: 2 | 1040-1180 | 2.0(+16) | 0 | 36400 | | |
| $(CH_3)_3CCH_2CH(CH_3)_2 + O^*(1D) \rightarrow$ products | | | | | | |
| PENTANE, 2,2,4-TRIMETHYL + OXYGEN ATOM | | | | | | |
| 74 MIC/PAR REACTION ORDER: 2 $k/k_{ref}$: 1.26 | 300 | - | - | - | 0.9 | 1.1 |
| NOTE: $k_{ref}$: $(CH_3)_4C + O^*(1D) \rightarrow$ products | | | | | | |
| $(CH_3)_3CCH_2CH(CH_3)_2 + O_2 \rightarrow (CH_3)_3CCH_2C(.)(CH_3)_2$ | | | | | | |
| $+ (CH_3)_3CCH(.)CH(CH_3)_2 + HO_2$ | | | | | | |
| PENTANE, 2,2,4-TRIMETHYL-, + OXYGEN MOLECULE | | | | | | |
| 73 DEG/DEN REACTION ORDER: 2 | 400-465 | 1.0(+15) | 0 | 19120 | | |
| $(CH_3)_3CC(CH_3)_3 \rightarrow (CH_3)_3C. + (CH_3)_3C.$ | | | | | | |
| BUTANE, 2,2,3,3-TETRAMETHYL- | | | | | | |
| 74 GOL/AIF REACTION ORDER: 1 | 850-1150 | 2.5(+16) | 0 | 34220 | | |
| NOTE: BEST FIT OF EXPERIMENTAL DATA TO log A = 16.4 FOR EACH C-C FISSION | | | | | | |
| $CH_2{=}CHCH{=}CHC(CH_3)_2COOH \rightarrow CH_2{=}CHCH_2CH{=}C(CH_3)_2 + CO_2$ | | | | | | |
| 3,5-HEXADIENOIC ACID, 2,2-DIMETHYL- | | | | | | |
| 76 BIG/WEA2 REACTION ORDER: 1 | 500-723 | 1.4(+13) | 0 | 23390±760 | 0.4 | 2.6 |
| NOTE: EDITOR'S EVALUATION BASED ON GIVEN $\Delta H^{\ddagger}$ AND $\Delta S^{\ddagger}$ | | | | | | |
| $CH_2{=}CHCH{=}CHC(CH_3)_2COOD \rightarrow CH_2{=}CHCHDCH{=}C(CH_3)_2 + CO_2$ | | | | | | |
| 3,5-HEXADIENOIC ACID-d, 2,2-DIMETHYL- | | | | | | |
| 76 BIG/WEA2 REACTION ORDER: 1 | 692 | 1.3(-2) | - | - | | |
| $CH_3CH_2CH_2CH_2COOCH(CH_3)_2 \rightarrow CH_3CH_2CH_2CH_2COOH + CH_3CH{=}CH_2$ | | | | | | |
| PENTANOIC ACID 1-METHYLETHYL ESTER | | | | | | |
| 77 SMI/MUT REACTION ORDER: 1 | 651 | 6.0(-3) | - | - | 0.9 | 1.1 |
| $(CH_3)_3CCOOCH(CH_3)_2 \rightarrow (CH_3)_3CCOOH + CH_3CH{=}CH_2$ | | | | | | |
| PROPANOIC ACID, 2,2-DIMETHYL-, 1-METHYL ETHYL ESTER | | | | | | |
| 77 SMI/MUT REACTION ORDER: 1 | 651 | 7.7(-3) | - | - | 0.9 | 1.1 |
| $CH_3OCO(CH_2)_5CH_3 \rightarrow CH_3OH + CO_2 + CH_2{=}CHCH_2CH_2CH_2CH_3$ | | | | | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| CARBONIC ACID HEXYL METHYL ESTER<br>72 BIG/WRE3 REACTION ORDER: 1<br>NOTE: k DETERMINED BY FLOW TUBE METHOD.<br>T RANGE ASSUMED. (OMITTED IN TEXT) | 593-648 | 7.9(+12) | 0 | 22950 | | |
| $CH_3OCOOCH(CH_3)CH_2CH_2CH_2CH_3 \rightarrow CH_3OH + CO_2 + CH_2{=}CHCH_2CH_2CH_2CH_3$<br>+ cis-, and trans-$CH_3CH{=}CHCH_2CH_2CH_3$<br>CARBONIC ACID METHYL 1-METHYLPENTYL ESTER<br>72 BIG/WRE3 REACTION ORDER: 1<br>NOTE: k DETERMINED BY FLOW-TUBE METHOD.<br>T RANGE ASSUMED. (OMITTED IN TEXT) | 598-648 | 1.9(+13) | 0 | 21340 | | |
| $(CH_3)_3COOC(CH_3)_3 \rightarrow (CH_3)_3CO. + (CH_3)_3CO.$<br>PEROXIDE, BIS(1,1-DIMETHYLETHYL)-<br>71 CAL/TRO REACTION ORDER: 1 | 373-423 | 7.9(+14) | 0 | 17920±890 | 0.1 | 9.3 |
| $(CH_3)_3COOC(CH_3)_3 \rightarrow (CH_3)_2CO + (CH_3)_2CO + CH_3 + CH_3$<br>PEROXIDE, BIS(1,1-DIMETHYLETHYL)-<br>73 PER/GEL REACTION ORDER: 1 | 500-660 | 4.0(+15) | 0 | 18820±500 | | |
| $(CH_3)_3CN{=}NC(CH_3)_3 \rightarrow$ products<br>DIAZENE, BIS(1,1-DIMETHYLETHYL)-<br>73 PER/BEA REACTION ORDER: 1 | 500-730 | 2.5(+16) | 0 | 21540±500 | | |
| $(CH_3)_2CHCH_2COCH_2CH(CH_3)_2 + OH \rightarrow$ products<br>4-HEPTANONE, 2,6-DIMETHYL-, + HYDROXYL FREE RADICAL<br>76 WIN/LIO REACTION ORDER: 2<br>NOTE: EVALUATION | 305 | 1.5(+13) | - | - | 0.7 | 1.3 |
| $CH_3(CH_2)_4COOCH(CH_3)_2 \rightarrow CH_3(CH_2)_4COOH + CH_3CH{=}CH_2$<br>HEXANOIC ACID 1-METHYL ETHYLESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 6.0(-3) | - | - | 0.9 | 1.1 |
| $(CH_3)_3CCH_2COOCH(CH_3)_2 \rightarrow (CH_3)_3CCH_2COOH + CH_3CH{=}CH_2$<br>BUTANOIC ACID, 3,3-DIMETHYL-, 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 6.0(-3) | - | - | 0.9 | 1.1 |
| $(CH_3CH_2)_2CHCOOCH(CH_3)_2 \rightarrow (CH_3CH_2)_2CHCOOH + CH_3CH{=}CH_2$<br>BUTANOIC ACID, 2-ETHYL-, 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 7.0(-3) | - | - | 0.9 | 1.1 |
| $CH_3CH_2CH_2CH(CH_3)COOCH(CH_3)_2 \rightarrow CH_3CH_2CH_2CH(CH_3)COOH$<br>+ $CH_3CH{=}CH_2$<br>PENTANOIC ACID, 2-METHYL-, 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 6.9(-3) | - | - | 0.9 | 1.1 |
| $CH_3COOC[CH(CH_3)_2](CH_3)CH_2CH_3 \rightarrow CH_3COOH + (CH_3)_2C{=}C(CH_3)CH_2CH_3$<br>+ cis-$CH_3CH{=}C[CH(CH_3)_2]CH_3$ + trans-$CH_3CH{=}C[CH(CH_3)_2]CH_3$<br>+ $CH_2{=}C[CH(CH_3)_2]CH_2CH_3$<br>3-PENTANOL, 2,3-DIMETHYL-, ACETATE<br>77 CUE/CHU REACTION ORDER: 1 | 485-533 | 1.7(+14) | 0 | 20430±250 | 0.6 | 1.7 |
| $CH_3CH_2CH_2CH_2OCOOCH_2CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2OH + CO_2$<br>+ $CH_2{=}CHCH_2CH_3$<br>CARBONIC ACID DIBUTYL ESTER<br>72 BIG/WRE1 REACTION ORDER: 1<br>NOTE: k DETERMINED BY SEALED-TUBE METHOD | 552-588 | 1.32(+12) | 0 | 21890 | | |
| NOTE: k DETERMINED BY FLOW TUBE METHOD | 663-708 | 1.6(+13) | 0 | 22900 | | |
| $(CH_3)_2CHCH_2OCOOCH_2CH(CH_3)_2 \rightarrow (CH_3)_2CHCH_2OH + CO_2 + (CH_3)_2C{=}CH_2$<br>CARBONIC ACID BIS(2-METHYLPROPYL) ESTER<br>72 BIG/WRE1 REACTION ORDER: 1<br>NOTE: k DETERMINED BY FLOW-TUBE METHOD | 663-708 | 5.5(+13) | 0 | 24560 | | |
| $CH_3CH_2CH(CH_3)OCOOCH(CH_3)CH_2CH_3 \rightarrow CH_3CH_2CHOHCH_3 + CO_2$<br>+ $CH_2{=}CHCH_2CH_3$ + cis-, and trans-$CH_3CH{=}CHCH_3$<br>CARBONIC ACID BIS(1-METHYLPROPYL) ESTER<br>72 BIG/WRE2 REACTION ORDER: 1<br>NOTE: k DETERMINED BY FLOW-TUBE METHOD | 593-648 | 1.5(+13) | 0 | 20935 | | |

| CHEMICAL REACTIONS | T/K | A | B | E/R (in °K) | k factors f | F |
|---|---|---|---|---|---|---|
| NOTE: k DETERMINED BY SEALED-TUBE METHOD | 489-540 | 9.1(+12) | 0 | 20535 | | |
| $(CH_3)_3COOCC(CH_3)_3 \rightarrow (CH_3)_3COH + CO_2 + (CH_3)_2C{=}CH_2$ | | | | | | |
| CARBONIC ACID BIS(1,1-DIMETHYLETHYL) ESTER<br>72 BIG/WRE3 REACTION ORDER: 1 | 453-498 | 2.4(+13) | 0 | 19125 | | |
| NOTE: k DETERMINED BY SEALED-TUBE METHOD | 593-648 | 1.3(+12) | 0 | 17110 | | |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD.<br>T RANGE ASSUMED. (OMITTED IN TEXT) | | | | | | |
| $CH_3(CH_2)_3CH_3 \rightarrow$ products | | | | | | |
| DECANE<br>71 GON/LEW REACTION ORDER: 1 | 713-793 | 2.0(+3) | 0 | 13340 | | |
| $CH_3CH_2OCH{=}C(CH_2CH_3)CH_2CH_2CH_2CH_3 + O_2{}^*(^1\Delta_g) \rightarrow$<br>$CH_3CH{=}C(CH_2CH_2CH_2CH_3)CH(OCH_2CH_3)OOH$<br>$+ CH_3CH_2CH_2CH{=}C(CH_2CH_3)CH(OCH_2CH_3)OOH$ | | | | | | |
| 1-HEXENE, 1-ETHOXY-2-ETHYL-, + OXYGEN MOLECULE<br>73 BUI/BER REACTION ORDER: 2 | 298 | 4.0(+8) | - | - | | |
| NOTE: GIVEN WITH CAUTION | | | | | | |
| $CH_3CH_2C(CH_3)_2OOC(CH_3)_2CH_2CH_3 \rightarrow$ products | | | | | | |
| PEROXIDE, BIS(1,1-DIMETHYLPROPYL)-<br>73 FER/GOL REACTION ORDER: 1 | 500-650 | 6.3(+15) | 0 | 18320±500 | | |
| $(CH_3CH_2CH_2)_2CHCOOCH(CH_3)_2 \rightarrow (CH_3CH_2CH_2)_2CHCOOH + CH_3CH{=}CH_2$ | | | | | | |
| PENTANOIC ACID, 2-PROPYL-, 1-METHYLETHYL ESTER<br>77 SMI/MUT REACTION ORDER: 1 | 651 | 6.9(-3) | - | - | 0.9 | 1.1 |
| $CH_3CH_2C(CH_3)_2OCOOC(CH_3)_2CH_2CH_3 \rightarrow CH_3CH_2C(CH_3)_2OH + CO_2$<br>$+ CH_2{=}C(CH_3)CH_2CH_3 + (CH_3)_2C{=}CHCH_3$ | | | | | | |
| CARBONIC ACID BIS(1,1-DIMETHYLPROPYL) ESTER<br>72 BIG/WRE3 REACTION ORDER: 1 | 593-648 | 1.0(+13) | 0 | 17965 | | |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD.<br>T RANGE ASSUMED. (OMITTED IN TEXT) | | | | | | |
| $CH_3(CH_2)_5OCOO(CH_2)_5CH_3 \rightarrow CH_3(CH_2)_5OH + CO_2$<br>$+ CH_2{=}CHCH_2CH_2CH_2CH_3$ | | | | | | |
| CARBONIC ACID DIHEXYL ESTER<br>72 BIG/WRE1 REACTION ORDER: 1 | 553-600 | 4.2(+12) | 0 | 22495 | | |
| NOTE: k DETERMINED BY SEALED-TUBE METHOD. | | | | | | |
| $CH_3(CH_2)_5OCOO(CH_2)_5CH_3 \rightarrow CH_3(CH_2)_5OH + CO_2$<br>$+ CH_2{=}CHCH_2CH_2CH_2CH_3$ | | | | | | |
| CARBONIC ACID DIHEXYL ESTER<br>72 BIG/WRE1 REACTION ORDER: 1 | 663-708 | 7.7(+12) | 0 | 22195 | | |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD | | | | | | |
| $CH_3CH_2CH_2CH_2CH(CH_3)OCOOCH(CH_3)CH_2CH_2CH_2CH_3 \rightarrow$<br>$CH_3CH_2CH_2CH_2CHOHCH_3 + CO_2 + CH_2{=}CHCH_2CH_2CH_2CH_3$<br>$+$ cis- and trans-$CH_3CH{=}CHCH_2CH_2CH_3$ | | | | | | |
| CARBONIC ACID BIS(1-METHYLPENTYL) ESTER<br>72 BIG/WRE2 REACTION ORDER: 1 | 593-648 | 6.3(+12) | 0 | 20280 | | |
| NOTE: k DETERMINED BY FLOW-TUBE METHOD | | | | | | |

1971


71 ADE/WAG Aders, W. K., und Wagner, H. Gg., "Die Reaktion von Wasserstoffatomen mit Methanol," Z. Phys. Chemie Neue Folge 74, 224 (1971)

71 ALB/HOY Albers, E. A., Hoyermann, K., Wagner, H. GG., and Wolfrum, J., "Absolute Measurements of Rate Coefficients for the Reactions of H and O Atoms with $H_2O_2$ and $H_2O$," Symp. Combust. 13, (Combustion Institute Pittsburgh, Pa., 1971) 81

71 ARM/CUL Armitage, J. W., and Cullis, C. F., "Studies of the Reaction between Nitrogen Dioxide and Sulfur Dioxide," Combust. and Flame 16, 125 (1971)

71 ATK/CVE Atkinson, R., and Cvetanovic, R. J., "Determination of the Absolute Values of the Rate Constants of the Reactions of O(3P) Atoms with Alkenes by a Modulation Technique," J. Chem. Phys. 55, 659 (1971)

71 AVR/KOL1 Avramenko, L. I., and Kolesnikova, R. V., "Determination of the Elementary Reaction Rate Constants on the Basis of the Summary Values of the Rate Constants. Communication 1. Reactions of Oxygen Atoms with Saturated and Unsaturated Hydrocarbons," Bull. Acad. Sciences USSR, Chem. Div., 20, 2556 (1971); tr. of: Izv. Akad. Nauk SSSR, Ser. Khim. 12, 2693 (1971)

71 AVR/KOL2 Avramenko, L. I., and Kolesnikova, R. V., "Determination of the Elementary Reaction Rate Constants on the Basis of the Summary Values of the Rate Constant. Communication 2. Reactions of Oxygen Atoms with Oxygen-Containing Compounds," Bull. Acad. Sciences USSR, Chem. Div., 20, 2562 (1971); tr. of: Izv. Akad. Nauk SSSR, Ser. Khim., 12, 2700 (1971)

71 BAK/BAI Baker, R. R., Baldwin, R. R., and Walker, R. W., "The use of the $H_2 + O_2$ Reaction in Determining the Velocity Constants of Elementary Reactions in Hydrocarbon Oxidation," Symp. Combust. 13, (Combustion Institute Pittsburgh, Pa., 1971) 291

71 BAL/LAN Baldwin, R. R., Langford, D. B., Matchan, M. J., Walker, R. W., and Yorke, D. A., "The High-Temperature Oxidation of Aldehydes," Symp. Combust. 13, (Combustion Institute Pittsburgh, Pa., 1971) 251

71 BAR/DZI Baronnet, F., Dzierzynski, M., Come, G. M., Martin, R., and Niclause, M., "The Pyrolysis of Neopentane at Small Extents of Reaction," Int. J. Chem. Kinet. 3, 197 (1971)

71 BAU/JEF Bauer, S. H., Jeffers, P., Lifshitz, A., and Yadava, B. P., "Reaction between CO and $SO_2$ at Elevated Temperatures: A Shock-Tube Investigation," Symp. Combust. 13 (Combustion Institute Pittsburgh, Pa., 1971) 417

71 BEL/BRA Belles, F. E., and Brabbs, T. A., "Experimental Verification of Effects of Turbulent Boundary Layers on Chemical-Kinetic Measurements in a Shock Tube," Symp. Combust. 13, (Combustion Institute Pittsburgh, Pa., 1971) 165

71 BEN/BLA Bennett, J. E., and Blackmore, D. R., "Rates of Gas-Phase Hydrogen-Atom Recombination at Room Temperature in the Presence of Added Gases," Symp. Combust. 13, (Combustion Institute Pittsburgh, Pa., 1971) 51

71 BLA/SAN Blades, A. T., and Sandhu, H. S., "The Arrhenius Factors for some Six-Center Unimolecular Reactions," Int. J. Chem. Kinet. 3, 187 (1971)

71 BOS/PER Bosnali, M. W., and Perner, D., "Reaktionen von pulsradiolytisch erzeugtem $CH(^2\Pi)$ mit Methan und anderen Substanzen," Z. Naturforsch, 26, 1768 (1971)

71 BRA/BEL1 Brabbs, T. A., Belles, F. E., and Brokaw, R. S., "Shock-Tube Measurements of Specific Reaction Rates in the Branched-Chain $H_2$-CO-$O_2$ System," Symp. Combustion. 13, (Combustion Institute Pittsburgh, Pa., 1971) 129

71 BRA/BEL2 Brabbs, T. A., and Belles, F. E., "Experimental Study of Effects of Laminar Boundary Layers on Chemical-Kinetic Measurements in a Shock Tube," Proceedings of the Eight Int. Shock Tube Symp. (Imperial College, London) 8, 24/7 (1971)

71 BRE/GLA Breen, J. E., and Glass, G. P., "The Reaction of the Hydroxyl Radical with Acetylene," Int. J. Chem. Kinet. 3, 145 (1971)

71 BRE/BIR Breshears, W. D., Bird, P. F., and Kiefer, J. H., "Density Gradient Measurements of $O_2$ Dissociation in Shock Waves," J. Chem. Phys. 55, 4017 (1971)

71 CAD/TRO Cadman, P., Trotman-Dickenson, A. F., and White, A. J., "Kinetics and Pressure-Dependence of the t-Butoxyl Radical Decomposition," J. Chem. Soc. A, 2296 (1971)

71 COL/WOR Coltharp, R. N., Worley, S. D., and Potter, A. E., "Reaction Rate of Vibrationally Excited Hydroxyl with Ozone," Applied Optics 10, 1786 (1971)

71 CON/VAN Connor, J. Van Roodselaar, A., Fair, R. W., and Strausz, O. P., "The Addition of Group VIa Atoms to Tetramethylthylene. An Addition Reaction with a Negative Activation Energy," J. Am. Chem. Soc., 93, 560 (1971)

71 COW/KEI Cowfer, J. A., Keil, D. G., Michael, J. V., and Yeh, C., "Absolute Rate Constants for the Reactions of Hydrogen Atoms with Olefins," J. Phys. Chem. 75, 1584 (1971)

71 D'A D'Amato, R. J., "The Thermal Decomposition of Nitrous Oxide as Studied in a Shock Tube by Optical Detection Methods," Diss. Abstr. Int. B 32, 853 (1971)

71 DAB/NIK Daby, E. F., Niki, H., and Weinstock, B., "Mass Spectrometric Studies of Rate Constants for Addition Reactions of Hydrogen and of Deuterium Atoms with Olefins in a Discharge-Flow System at 300°K," J. Phys. Chem. 75, 1601 (1971)

71 DEM DeMore, W. B., "Rates and Mechanism of Alkyne Ozonation," Int. J. Chem. Kinet. 3, 161 (1971)

71 EBE/HOY Eberius, K. H., Hoyermann, K., and Wagner, H. GG., "Experimental and Mathematical Study of a Hydrogen-Oxygen Flame," Symp. Combust. 13, (Combustion Institute Pittsburgh, Pa., 1971) 713

71 ELL/CAS Ellenrieder, G. Von., Castellano, E., und Schumacher, H. J., "Die Kinetik und der Mechanismus des Photochemischen Ozonzerfalls im Licht der Wellenlaenge 2537Å," Z. fuer Phys. Chemie (Frankfurt am Main) 76, 240 (1971)

71 FAL/SUN Falconer, W. E., and Sunder, W. A., "Disproportionation-Combination Ratios of Small Alkyl Radicals Formed by the Mercury-Photosensitized Hydrogenation of Olefins in the Gas Phase," Int. J. Chem. Kinet. 3, 523 (1971)

71 FIF/MOR Fifer, R., Moreau, R., and Bauer, S. H., "The Reactions between $SO_2$ and $C_2H_2$ (and $C_2H_4$) at Elevated Temperatures. A Single-Pulse Shock Tube Investigation," Int. J. Chem. Kinet. 3, 249 (1971)

71 FIN/SNE Findlay, F. D., and Snelling, D. R., "Temperature Dependence of the Rate Constant for the Reaction $O_2(^1\Delta_g) + O_3 \rightarrow 2O_2 + O$," J. Chem. Phys. 54, 2750 (1971)

71 FRA/JON Francis, P. D., and Jones, A. R., "ESR Measurement of the Reaction between H Atoms and $N_2H_4$," J. Chem. Phys. 54, 5085 (1971)

71 GAY/PRA Gay, A., and Pratt, N. H., "Hydrogen-Oxygen Recombination Measurements in a Shock Tube Steady Expansion," Proceedings of the Int. Shock Tube Symp. (Imperial College, London) 8, 39/1 (1971)

71 GEH/HOY Gehring, Von, M., Hoyermann, K., Wagner, H. Gg., und Wolfrum, J., "Die Reaktion von Atomarem Wasserstoff mit Hydrazin," Ber. Bunsenges. Phys. Chem. 75, 1287 (1971)

71 GEO/RAB Georgakakos, J. H., Rabinovitch, B. S., and Larson, C. W., "Disproportionation-Combination Ratios of Large Branched Alkyl Radicals," Int. J. Chem. Kinet. 3, 535 (1971)

71 GOL/RAY Goldman, C. S., Greenberg, R. I., and Heicklen, J., "The Reactions of $O(^1D)$ with Ozone and Nitrous Oxide," Int. J. Chem. Kinet. 3, 501 (1971)

71 GON/LEW Gonzalez, M. G., Lew, L., and Cunningham, R. E., "Determinacion de la Cinetica de Descomposicion Termica de Alcoholes e Hidrocarburos Mediante un Reactor Pulso," Lab. Ensayo Mater. Invest. Tecnol., Prov. Buenos Aires, Ser 2 1971 (No. 184,103-23 Span)

71 GOR/MUL Gordon, S. Mulac, W. and Nangia, P., "Pulse Radiolysis of Ammonia Gas. II. Rate of Disappearance of the $NH_2(X^2B_1)$ Radical," J. Phys. Chem. 75, 2087 (1971)

71 HAN/SMI Hancock, G., and Smith, I. W. M., "Infra-red Chemiluminescence from Vibrationally Excited CO. Part 1. The Reaction of Atomic Oxygen with Carbon Disulphide," Trans. of Faraday Soc. 67, 2586 (1971)

71 HAR Hartig, R., Troe, J., and Wagner, H. GG., "Thermal Decomposition of Methane Behind Reflected Shock Waves,"

Pa., 1971) 147

71 HIK/EYR Hikida, T., Eyre, J. A., and Dorfman, L. M., "Pulse Radiolysis Studies. XX. Kinetics of some Addition Reactions of Gaseous Hydrogen Atoms by Fast Lyman-α Absorption Spectrophotometry," J. Chem. Phys. 54, 3422 (1971)

71 HIP/TRØ Hippler, H., and Troe, J., "Hochdruckbereich der Rekombination $Ø + Ø_2 \rightarrow Ø_3$," Ber. Bunsen Gesellschaft fuer Phys. Chemie 75, 27 (1971)

71 HØY/WAG Hoyermann, K., Wagner, H. Gg., Wolfrum, J., and Zellner, R., "Die Geschwindigkeit der Reaktion von Atomarem Wasserstoff mit Acetylen. II. Die Reaktionen $D + C_2H_2$ und $H + C_2D_2$," Ber Bunsen Gesellschaft fuer Phys. Chemie 75, 22 (1971)

71 HUI/HER Huie, R. E., Herron, J. T., and Davis, D. D., "Absolute Rate Constants for the Reaction of Atomic Oxygen with 1-Butene over the Temperature Range of 259-493°K," J. Phys. Chem. 75, 3902 (1971)

71 HUS/KIR1 Husain, D., and Kirsch, L. J., "The Study of Electronically Excited Carbon Atoms, $C(2^1D_2)$, by Photoelectric Measurement of Time-Resolved Atomic Absorption," Chem. Phys. Lett. 9, 412 (1971)

71 HUS/KIR2 Husain, D., Kirsch, L. J., "Study of Electronically Excited Carbon Atoms, $C(2^1D_2)$, by Time-resolved Atomic Absorption at 193.1 nm, $(3^1P^o_1 \leftarrow 2^1D_2)$ II: Reactions of $C(2^1D_2)$ with Molecules," Trans. Faraday Soc. 67, 3166, (1971)

71 ILL/WEL Illés, Vendel., and Károly, Welther., "Etán Pirolízise Laboratóriumi Esoereaktorban," Magy. Kem. Lapja, 26, 587 (1971)

71 JAF Jaffe, S., "Some Reactions of Nitrogen Dioxide with Olefins," Chem. React. in Urban Atmos., Proc. Symp. Gen. Motor Res. Lab. 103 (1971)

71 KRE Krezenski, D. C., "Competitive Reaction of $Ø(^3P)$ with Øzone and Carbonyl Sulfide," Diss. Abstr. Int. B 32, 2633 (1971)

71 KRE/SIM Krezenski, D. C., Simonaitis, R., and Heicklen, J., "The Reactions of $O(^3P)$ with Ozone and Carbonyl Sulfide," Int. J. Chem. Kinet. 3, 467 (1971)

71 KUR/PET Kurylo, M. J., Peterson, N. C., and Braun, W., "Absolute Rate of the Reaction $H + H_2S$," J. Chem. Phys. 54, 943 (1971)

71 LIN/KAU Lin, C-L., and Kaufman, F., "Reactions of Metastable Nitrogen Atoms," J. Chem. Phys. 55, 3760 (1971)

71 LIP Lipkea, W. H., "$N_2Ø$ Decomposition and its Subsequent Reaction with Atomic Oxygen to Produce NO - A single-Pulse Shock Tube Study," Diss. Abstr. Int. B 32, 2739 (1971)

71 MAG/IØA Magaril, R. Z., Ioanidis, N. V., Korzun, N. V., and Pol'skaya, N. I., "Thermal Decomposition of Hex-1-ene," Russ. J. of Phys. Chem. 45, 1392 (1971); tr. of: Z. Fiz. Khim. 45, 2455 (1971)

71 [illegible]/KEL McNesby, J. R., and Kelly, R. V., "Abstraction of Hydrogen by Methylene," Int. J. Chem. Kinet. 3, 293 (1971)

71 MER/LEV Merryman, E. L., and Levy, A., "Sulfur Trioxide Flame Chemistry-$H_2S$ and CØS Flames," Symp. Combust. 13, (Combustion Institute Pittsburgh Pa., 1971) 427

71 MIY/TAK1 Miyazaki, S., and Takahashi, S., "On the Reaction of Oxygen Atom with Carbon Disulphide. Part 2. Memoirs of the Defense Acad. (Japan) 11, 307 (1971)

71 MIY/TAK2 Miyazaki, S., and Takahashi, S., "On the Reaction of Oxygen Atom with Carbon Disulphide. Part 3," Memoirs of the Defense Acad. (Japan) 11, 329 (1971)

71 MØR/NIK1 Morris, E. D. Jr., and Niki, H., "Mass Spectrometric Study of the Reaction of Hydroxyl Radical with Formaldehyde," J. Chem. Phys. 55, 1991 (1971)

71 MØR/NIK2 Morris, E. D. Jr., and Niki, H., "Reactivity of Hydroxyl Radicals with Olefins," J. Phys. Chem. 75, 3640 (1971)

71 MØR/STE Morris, E. D. Jr., Stedman, D. H., and Niki, H., "Mass Spectrometric Study of the Reactions of the Hydroxyl Radical with Ethylene, Propylene, and Acetaldehyde in a Discharge-Flow System," J. Am. Chem. Soc., 93, 3570 (1971)

71 OSB Osborne, D. T., "Absolute Rate Constants and Relative third Body Effects for the Reactions: $H + C_2H_4$, $H + C_2D_4$, $D + C_2D_4$, $H + C_2H_2$, $H + O_2$ and $H + NO$," Diss. Abst. Int. B 31, 5908 (1971)

71 PAP/ASH Papadopoulos, C., Ashmore, P. G., and Tyler, B. J., "Reactions of Oxygen Atoms with Ethane and n-Butane," Symp. Combust 13, (Combustion Institution Pittsburgh, Pa., 1971) 281

71 PAP/LAI Papic, M. M., and Laidler, K. J., "Kinetics of the Mercury-Photosensitized Decomposition of Propane. Part II. Reactions of the Propyl Radicals," Can. J. Chem. 49, 549 (1971)

71 POT/COL Potter, A. E. Jr., Coltharp, R. N., and Worley, S. D., "Mean Radiative Lifetime of Vibrationally Excited (v=9) Hydroxyl. Rate of the Reaction of Vibrationally Excited Hydroxyl (v=9) with Ozone," J. Chem. Phys. 54, 992 (1971)

71 SCØ/CVE Scott, P. M., and Cvetanovic, R. J., "Relative Rate Constants for Reactions of $O(^1D)$ Atoms Generated by Flash Photolysis of Ozone," J. Chem. Phys. 54, 1440 (1971)

71 SLA/WØØ Slanger, T. G., Wood, B. J., and Black, G., "Temperature Coefficients for $N(^2D)$ Quenching by $O_2$ and $N_2O$," J. Geophys. Res. 76, 8430 (1971)

71 STR/O'C Strausz, O. P., O'Callaghan, W. B., Lown, E. M., and Gunning, H. E., "Reactions of Sulfur Atoms. XII. Arrhenius Parameters for the Addition to Olefins and Acetylenes," J. Am. Chem. Soc. 93, 559 (1971)

71 STU/NIK1 Stuhl, F., and Niki, H., "Measurements of Rate Constants for Termolecular Reactions of $O(^3P)$ with NO, $O_2$, CO, $N_2$, and $CO_2$ using a Pulsed Vacuum-uv Photolysis-Chemiluminescent Method," J. Chem. Phys. 55, 3943 (1971)

71 STU/NIK2 Stuhl, F., and Niki, H., "Determination of Rate Constants for Reactions of O Atoms with $C_2H_2$, $C_2D_2$, $C_2H_4$, and $C_3H_6$ using a Pulsed Vacuum-uv Photolysis-Chemiluminescent Method," J. Chem. Phys. 55, 3954 (1971)

71 TAK Takahashi, S., "On the Reaction of Oxygen Atom with Carbon-Disulphide. Part 1," Memoirs of the Defense Acad. (Japan) 11, 191 (1971)

71 Tay/Sim Taylor, G. W., and Simons, J. W., "Chemically Activated 3-Methyl-1-Butene and 2-Methyl-1-Butene from Photolysis of Diazomethane-Isobutene-Neopentane-Oxygen Mixtures," Int. J. Chem. Kinet. 3, 453 (1971)

71 TES/FOR Tessier, A., and Forst, W., "Kinetics of Hydrogen Peroxide Pyrolysis by Molecular-Beam Mass Spectrometry," Int. J. Mass Spect. and Ion Phys. 7, 281 (1971)

71 VAN/CAL Van den Bergh, H. E., and Callear, A. B., "Spectroscopic Measurement of the Rate of the Gas-phase Combination of Methyl Radicals with Nitric Oxide and Oxygen at 295 K," Trans. of Faraday Soc. 67, 2017 (1971)

71 WAT Watkins, K. W., "Photolysis of n-Pentylazomethane Vapor. Reactions of the n-Pentyl Radical," J. Am. Chem. Soc. 93, 6355 (1971)

71 WHI Whiting, L. V., "Part A-Oxidation of Thiols. Part B-Nitrogen Atoms with Formaldehyde," Diss. Abstr. Int. B 32, 872 (1971)

1972

72 ACK/PIT Ackerman, R. A., Pitts, J. N. Jr., and Steer, R. P., "Concerning the Effect of Pressure on the Rate of Reaction of $O_2(^1\Delta_g)$ with Tetramethylethylene," Chem. Phys. Lett. 12, 526 (1972)

72 AHU/MIC Ahumada, J. J., Michael, J. V., and Osborne, D. T., "Pressure Dependence and Third Body Effects on the Rate Constants for $H + O_2$, $H + NO$, and $H + CO$," J. Chem. Phys. 57, 3736 (1972)

72 AND/KAU Anderson, J. G., and Kaufman, F., "Kinetics of the Reaction $OH + NO + M \rightarrow HNO_3 + M$," Chem. Phys. Lett. 16, 375 (1972)

72 ARI/WAR Arin, L. M., and Warneck, P., "Reaction of Ozone with Carbon Monoxide," J. Phys. Chem. 76, 1514 (1972)

72 ATK/CVE Atkinson, R., and Cvetanovic, R. J., "Activation Energies of the Addition of $O(^3P)$ Atoms to Olefins," J. Chem. Phys. 56, 432 (1972)

72 AZA/GYU Azatyan, V. V., Gyulbekyan, Zh. Kh., Nalbandyan, A. B., and Romanovich, L. B., "Kinetics of the Reaction of Hydrogen and Oxygen with Acetone," Arm. Khim. Zh. 25, 727 (1972)

72 BAL/EGO Balakhnin, V. P., and Egorov, V. I., "Kinetic Investigation of the Elemental Reactions of Oxygen Atoms in the Gas Phase by ESR. III. The Reaction $O(^3P) + O_3 = 2O_2$," Kinet. Catal. 13, 255 (1972); tr. of: Kinet. i Katal. 13, 282 (1972)

72 BAL/FUL Baldwin, R. R., Fuller, A. R., Longthorn, D., and Walker, R. W., "Addition of Formaldehyde to Slowly Reacting Hydrogen + Oxygen Mixtures," J. Chem. Soc., Faraday Trans. I 68, 1362 (1972)

72 BAL/JAC Baldwin, R. R., Jackson, D., Melvin, A., and Rossiter, B. N., "The Second Limit of Hydrogen + Carbon Monoxide + Oxygen Mixtures," Int. J. Chem. Kinet. 4, 277 (1972)

72 BAS/JAM Basco, N., James, D. G. L., and James, F. C., "A Quantitative Study of Alkyl Radical Reactions by Kinetic Spectroscopy. II. Combination of the Methyl Radical with the Oxygen Molecule," Int. J. Chem. Kinet. 4, 129 (1972)

72 BEC/GRO Becker, K. H., Groth, W., and Schurath, U., "Reactions of $O_2(^1\Delta_g)$ with Ozone," Chem. Phys. Lett. 14, 489 (1972)

72 BED/THO Bedford, G., and Thomas, J. H., "Reaction between Ammonia and Nitrogen Dioxide," J. Chem. Soc., Faraday Trans. I 68, 2163 (1972)

72 BIG/WRE1 Bigley, D. B., and Wren, C. M., "Pyrolysis of Carbonates. Part I. The Gas-phase Pyrolysis of some Symmetrical Primary Alkyl Carbonates," J. Chem. Soc. Perkin Trans. II 926 (1972)

72 BIG/WRE2 Bigley, D. B., and Wren, C. M., "Pyrolysis of Carbonates. Part II. The Gas-phase Pyrolysis of some Symmetrical 1-Methylalkyl Carbonates. Kinetic Deuterium Isotope Effect," J. Chem. Soc. Perkin Trans. II 1744 (1972)

72 BIG/WRE3 Bigley, D. B., and Wren, C. M., "Carbonate Pyrolysis. Part III. The Gas-phase Pyrolysis of some Unsymmetrical and t-Alkyl Carbonates," J. Chem. Soc. Perkin Trans. II 2359 (1972)

72 BLA/DAV Blake, P. G., and Davis, H. H., "Kinetics of Dimerisation of Gaseous Keten," J. Appl. Chem. Biotechnol. 22, 491 (1972)

72 BRE/BIR Breshears, W. D., and Bird, P. F., "Precise Measurements of Diatomic Dissociation Rates in Shock Waves," Los Alamos Scientific Lab. (Report) LA-DC-72-369 (1972)

72 BUL/COO1 Bullock, G. E., and Cooper, R., "Reactions of Cyanogen Radicals Part 2. Reactions with $(CN)_2$ and $O_2$," J. Chem. Soc., Faraday Trans. I 68, 2175 (1972)

72 BUL/COO2 Bullock, G. E., and Cooper, R., "Reactions of Cyanogen Radicals. Part 3. Arrhenius Parameters for Reactions with Alkanes," J. Chem. Soc., Faraday Trans. I 68, 2185 (1972)

72 CAD/LIN Cadle, R. D., Lin, S-S., and Hausman, R. F. Jr., "The Reaction of $O(^3P)$ with Propionaldehyde and Acrolein in a Fast-Flow System," Chemosphere 1, 15 (1972)

72 CAS/SCH Castellano, E., and Schumacher, H. J., "The Kinetics and the Mechanism of the Photochemical Decomposition of Ozone with Light of 3340 Å Wavelength," Chem. Phys. Lett. 13, 625 (1972)

72 CLY/CRU Clyne, M. A. A., and Cruse, H. W., "Atomic Resonance Fluorescence Spectrometry for Rate Constants of Rapid Bimolecular

Reactions. Part 1. Reactions O + $NO_2$, Cl + ClNO, Br + ClNO," J. Chem. Soc., Faraday Trans. II 68, 1281 (1972)

72 COX/PEN — Cox, R. A., and Penkett, S. A., "Aerosol Formation from Sulphur Dioxide in the Presence of Ozone and Olefinic Hydrocarbons," J. Chem. Soc., Faraday Trans. I 68, 1735 (1972)

72 DAV/COR — Davis, A. M., and Corcoran, W. H., "Rate and Mechanism of the Partial Oxidation of Acetaldehyde by Parts-per-Million Concentrations of Nitrogen Dioxide," Ind. and Eng. Chem., Fund. 11, 431 (1972)

72 DAV/HUI — Davis, D. D., Huie, R. E., Herron, J. T., Kurylo, M. J., and Braun, W., "Absolute Rate Constants for the Reaction of Atomic Oxygen with Ethylene over the Temperature Range 232-500°K," J. Chem. Phys. 56, 4868 (1972)

72 DAV/KLE1 — Davis, D. D., Klemm, R. B., and Pilling, M., "A Flash Photolysis-Resonance Fluorescence Kinetics Study of Ground-State Sulfur Atoms: I. Absolute Rate Parameterss for Reaction of $S(^3P)$ with $O_2(^3\Sigma)$," Int. J. Chem. Kinet. 4, 367 (1972)

72 DAV/KLE2 — Davis, D. D., Klemm, R. B., Braun, W., and Pilling, M., "A Flash Photolysis-Resonance Fluorescence Kinetics Study of Ground-State Sulfur Atoms. II. Rate Parameters for Reaction of $S(^3P)$ with $C_2H_4$," Int. J. Chem. Kinet. 4, 383 (1972)

72 DAY/DIX — Day, M. J., Dixon-Lewis, G., and Thompson, K., "Flame Structure and Flame Reaction Kinetics VL. Structure, Mechanism and Properties of Rich Hydrogen + Nitrogen + Oxygen Flames," Proceedings Royal Soc. (London) A 330, 199 (1972)

72 DEM — DeMore, W. B., "Pressure Dependence and Mechanism of the Reaction of Atomic Oxygen and Carbon Monoxide," J. Phys. Chem. 76, 3527 (1972)

72 DIX — Dixon-Lewis, G., "Flames Structure and Flame Reaction Kinetics VII. Reactions of Traces of Heavy Water, Deuterium and Carbon Dioxide added to rich Hydrogen + Nitrogen + Oxygen Flames," Proceedings Royal Soc. (London) A 330, 219 (1972)

72 DON/LIT — Donovan, R. J., and Little, D. J., "The Rate of the Reaction $S(^3P_J) + O_2$," Chem. Phys. Lett 13, 488 (1972)

72 DUT — Dutton, M. L., "High Pressure Gas Kinetics. I. The Thermal Decomposition of Nitryl Chloride. II. The Thermal Decomposition of Nitrogen Pentoxide," Diss. Abstr. Int. B 32, 6324 (1972)

72 DUT/BUN — Dutton, M. L., Bunker, D. L., and Harris, H. H., "Two Familiar Gas Reactions at Suprahigh Pressure," J. Phys. Chem. 76, 2614 (1972)

72 FAL/SUN — Falconer, W. E., and Sunder, W. A., "Abstraction by Hydrogen Atoms from Ethylene, Propylene, Butene-1, and cis- and trans-Butene-2," Int. J. Chem. Kinet. 4, 315 (1972)

72 FOR/SNE — Fortin, C. J. Snelling, D. R., and Iardif, A., "The Ultraviolet Flash Photolysis of Ozone and the Reaction of $O(^1D)$ with $H_2O$," Can. J. Chem. 50, 2747 (1972)

72 FRI/SUT Friswell, N. J., and Sutton, M. M., "Radical Recombination Reactions in $H_2/O_2/N_2$ Flames: Participation of the $HO_2$ Radical," Chem. Phys. Lett. 15, 108 (1972)

72 GER/DEM Gershenzon, Yu, M., Dement'ev, A. P., and Moin, F. B., "Integral Diffusion Method for the Study of the Kinetics of Fast Reactions in the Resonator of an ESR Spectrometer," Bull. Acad. Sci. USSR, Chem Sci. 21, 570 (1972); tr. of: Izv. Akad. Nauk SSSR Ser. Khim. 3, 609 (1972)

72 GLA/TRO Glaenzer, K., and Troe, J., "Thermische Zerfallsreaktionen von Nitroverbindungen I: Dissoziation von Nitromethan," Helvetica Chimica Acta 55, 2884 (1972)

72 GOL/SOI Golden, D. M., Solly, R. K., Gac, N. A., and Benson, S. W., "Very Low-Pressure Pyrolysis. VII. The Decomposition of Methylhydrazine, 1,1-Dimethylhydrazine, 1,2-Dimethylhydrazine, and Tetramethylhydrazine. Concerted Deamination and Dehydrogenation of Methylhydrazine," Int. J. Chem. Kinet. 4, 433 (1972)

72 GOR/VOL Gorse, R. A., and Volman, D. H., "Photochemistry of the Gaseous Hydrogen Peroxide-Carbon Monoxide System: Rate Constants for Hydroxyl Radical Reactions with Hydrogen Peroxide and Isobutane by Competitive Kinetics," J. Photochem. 1, 1 (1972)

72 GOR/WAL Gorton, P. J., and Walsh, R., "The Kinetics of the cis-trans-Isomerisation of the 1-Methylallyl Radical. A new Technique for the Study of Unimolecular Radical Reactions," J. Chem. Soc. Chem. Comm. 13, 783 (1972)

72 GRA/LIS Gray, D., Lissi, E., and Heicklen, J., "The Reaction of Hydrogen Peroxide with Nitrogen Dioxide and Nitric Oxide," J. Phys. Chem. 76, 1919 (1972)

72 GRE Greenberg, R. I., "Reactions of $O(^1D)$ with Nitrous Oxide and Methane," Diss. Abstr. Int. B 32, 6294 (1972)

72 GRE/HEI Greenberg, R. I., and Heicklen, J., "The Reaction of $O(^1D)$ with $CH_4$," Int. J. Chem. Kinet. 4, 417 (1972)

72 GRO/HAS Growcock, F. B., Hase, W. L., and Simons, J. W., "Kinetics of Vibrationally Hot Propane Produced by Methylene Insertion into Ethane," J. Phys. Chem. 76, 607 (1972)

72 HAL Haluk, M., "A Mass-Spectrometric Study of the Homogeneous Thermal Decomposition of Ammonia in a Shock Tube," Diss. Abstr. Int. B 32, 5162 (1972)

72 HAN/OBE Hand, C. W., and Obenauf, R. H. Jr., "Mass Spectrometric Study of the Reaction of Dicyanoacetylene with Active Nitrogen," J. Phys. Chem. 76, 2643 (1972)

72 HAN/RID Hancock, G., Ridley, B. A., and Smith, I. W. M., "Infra-red Chemiluminescence from Vibrationally Excited CO. Part 2. Product Distribution from the Reaction $O + CS \rightarrow CO + S$," J. Chem. Soc., Faraday Trans. II 68, 2117 (1972)

72 HAS/JOH Hase, W. L., Johnson, R. L., Simons, J. W., "The Decomposition of Chemically Activated n-Butane, Isopentane,

Neohexane, and n-Pentane and the Correlation of their Decomposition Rates with Radical Recombination Rates," Int. J. Chem. Kinet. 4, 1 (1972)

72 HER/WAG Herbrechtsmeier, Von P., and Wagner, H. G., "Reaktion von $O(^3P)$-Atomen mit Allen," Ber. Bunsenges. Phys. Chem. 76, 517 (1972)

72 HIA/BEN1 Hiatt, R., and Benson, S. W., "Rate Constants for Alkyl Radical Recombination. II. The Isopropyl Radical," Int. J. Chem. Kinet. 4, 151 (1972)

72 HIA/BEN2 Hiatt, R., and Benson, S. W., "Rate Constants for Radical Recombination. IV. The Activation Energy for Ethyl Radical Recombination," J. Am. Chem. Soc. 94, 6886 (1972)

72 HOC/GHO Hochanadel, C. J., Ghormley, J. A., and Ogren, P. J., "Absorption Spectrum and Reaction Kinetics of the $HO_2$ Radical in the Gas Phase," J. Chem. Phys. 56, 4426 (1972)

72 HOP Hopf, H., "Thermische Isomerisierungen, IV Die Propargyl-Cope-Umlagerung Von 4-Methyl-Hexadien-(1,2)-in-(5)," Tetrahedron Lett. 34, 3571 (1972)

72 HUI/HER1 Huie, R. E., Herron, J. T., and Davis, D. D., "Absolute Rate Constants for the Reaction $O + O_2 + M \rightarrow O_3 + M$ over the Temperature Range 200-346°K," J. Phys. Chem. 76, 2653 (1972)

72 HUI/HER2 Huie, R. E., Herron, J. T., and Davis, D. D., "Absolute Rate Constants for the Addition and Abstraction Reactions of Atomic Oxygen with 1-Butene over the Temperature Range 190-491 K," J. Phys. Chem. 76, 3311 (1972)

72 HUS/KIR1 Husain, D., Kirsch, L. J., and Donovan, R. J., "A Kinetic Study of $O(^2P_J)$ by Atomic Absorption Spectroscopy Following the Flash Photolysis of Ozone," J. Photochem. 1, 69 (1972)

72 HUS/KIR2 Husain, D., Kirsch, L. J., and Wiesenfeld, J. R., "Collisional Quenching of Electronically Excited Nitrogen Atoms, $N(2^2D_J, 2^2P_J)$ by Time-resolved Atomic Absorption Spectroscopy," Faraday Dis. Chem. Soc. 53, 201 (1972)

72 ILL Illes, V., "The Pyrolysis of Gaseous Hydrocarbons. V. The Kinetics of the Thermal Decomposition of an Isobutane-n-Butane Mixture," Acta Chim. (Budapest) 72, 117 (1972)

72 ILL/SZA Illés, V., and Szalay, O., "New Method for Describing the Overall Decomposition Rate of Hydrocarbon Gases," Magy. Kem. Foly. 78, 108 (1972)

72 JAC/HOU Jachimowski, C. J., and Houghton, W. M., "Shock-Tube Study of the Reaction $H + O_2 + Ar \rightarrow HO_2 + Ar$," NASA Tech. Note: NASA TN D-6990 Nat. Aeronautics and Space Admin. Washington, D.C. (1972)

72 JAC/WIN Jacob, A., and Winkler, C. A., "Kinetics of the Reactions of Oxygen Atoms and Nitrogen Atoms with Sulfur Trioxide," J. Chem. Soc., Faraday Trans. I 68, 2077 (1972)

72 JAK/AHM Jakubowski, E., Ahmed, M. G., Lown, E. M., Sandhu, H. S., Gosavi, R. K., and Strausz, O. P., "Sulfur Atom Abstraction from Episulfides and Carbonyl Sulfide by Methyl Radicals," J. Am. Chem.

Soc. 94, 4094 (1972)

72 KAL/KOR Kalinenko, R. A., Korochuk, S. I., Lavrovskii, K. P., Maksimov, Yu. V., and Yampol'skii, Yu. P., "The Role of Hydrogen Atoms in Ethane Cracking," Dokl. Chem. 204, 511 (1972); tr. of Dokl. Akad. Nauk SSSR 204, 1125 (1972)

72 KUR1 Kurylo, M. J., "Absolute Rate Constants for the Addition of $O(^3P)$ Atoms to Propylene," Chem. Phys. Lett. 14, 117 (1972)

72 KUR2 Kurylo, M. J., "Absolute Rate Constants for the Reaction $H + O_2 + M \rightarrow HO_2 + M$ over the Temperature Range 203-404 K," J. Phys. Chem. 76, 3518 (1972)

72 LAN/OLD Langford, R. B., and Oldershaw, G. A., "Flash Photolysis of $H_2S$," J. Chem. Soc., Faraday Trans. I 68, 1550 (1972)

72 LEF/MEA LeFevre, H. F., Meagher, J. F., and Timmons, R. B., "The Kinetics of the Reactions of $O(^3P)$ Atoms with Dimethyl Ether and Methanol," Int. J. Chem. Kinet. 4, 103 (1972)

72 LIT/DAL Little, D. J., Dalgleish, A., and Donovan, R. J., "Relative Rate Data for the Reactions of $S(^1D_2)$ using the NS Radical as Spectroscopic Marker," Faraday Dis. Chem. Soc. 53, 211 (1972)

72 LOU/CVE Loucks, L. F., and Cvetanovic, R. J., "Competitive Photolysis of $CO_2$ and $N_2O$ at 1633 Å," J. Chem. Phys. 57, 1682 (1972)

72 MAR/PUR Marshall, R. M., and Purnell, J. H., "Rate of Recombination of Ethyl Radicals in the Gas Phase," J. C. S. Chem. Comm., 13, 764 (1972)

72 MAT/SLA Matsuda, S., Slagle, I. R., Fife, D. J., Marquart, J. R., and Gutman, D., "Shock-Tube Study of the Acetylene-Oxygen Reaction. IV. Kinetic Study of CH, $C_2$, and Continuum Chemiluminescence During the Induction Period," J. Chem. Phys. 57, 5277 (1972)

72 MCC McCrumb, J. L., "Kinetics of the Gas Phase Reaction of Atomic Oxygen and Ozone," Diss. Abstr. Int. B 32, 5718 (1972)

72 MCC/KAU McCrumb, J. L., and Kaufman, F., "Kinetics of the $O + O_3$ Reaction," J. Chem. Phys. 57, 1270 (1972)

72 MCM/GOI McMillen, D. F., Golden, D. M., and Benson, S. W., "Hydrogen Chloride Accelerated Thermal Decomposition of 2,2'-Azoisobutane. Recombination Rate of tert-Butyl Radicals," J. Am. Chem. Soc. 94, 4403 (1972)

72 MOO/ALI Moortgat, G. K., and Allen, E. R., "The Reaction of Hydrogen Atoms with Molecular Oxygen," Am. Chem. Soc. 163rd Meeting (Abstracts of Papers) 163, PHYS-100 (1972)

72 MOR/SMI Morley, C., and Smith, I. W. M., "Rate Measurements of Reactions of OH by Resonance Absorption. Part 1. Reactions of OH with $NO_2$ and NO," J. Chem. Soc., Faraday Trans. II 68, 1016 (1972)

72 NAP/SUB Napier, D. H., and Subrahmanyam, N., "Pyrolysis of Methane in a Single Pulse Shock Tube," J. Appl. Chem. Biotechnol. 22, 303 (1972)

72 NIK/MAI Niki, T., and Mains, G. J., "The Chemical Kinetics of the

Pyrolysis of Hydrogen Deuteride," J. Phys. Chem. 76, 3538 (1972)

72 NIK/MOR1 Niki, H., Morris, E. D. Jr., and Breitenbach, L. P., "Reaction of OH with $H_2S$," Am. Chem. Soc. 164th Meeting (Abstracts of Papers) 164, PHYS-116 (1972)

72 NIK/MOR2 Niki, H., and Morris, E. D. Jr., "Reaction of Methyl Radicals with Atomic Oxygen," Am. Chem. Soc. 164th Meeting (Abstracts of Papers) 164, PHYS-117 (1972)

72 PAC/PUR1 Pacey, P. D., and Purnell, J. H., "Arrhenius Parameters for the Reactions $CH_3\cdot + C_4H_{10} \rightarrow CH_4\cdot + C_4H_9\cdot$ and $C_2H_5\cdot + C_4H_{10} \rightarrow C_2H_6 + C_4H_9\cdot$," Int. J. Chem. Kinet. 4, 657 (1972)

72 PAC/PUR2 Pacey, P. D., and Purnell, J. H., "Arrhenius Parameters of the Reaction $CH_3\cdot + C_2H_6 \rightarrow CH_4 + C_2H_5\cdot$," J. Chem. Soc. Faraday Trans. I 68, 1462 (1972)

72 PAR/SYM Paraskevopoulos, G., Symonds, V. B., and Cvetanovic, R. J., "Relative Rate of Reaction of $O(^1D_2)$ with $N_2O$," Can. J. Chem. 50, 1838 (1972)

72 PAU/JOH Paukert, T. T., and Johnston, H. S., "Spectra and Kinetics of the Hydroperoxyl Free Radical in the Gas Phase," J. Chem. Phys. 56, 2824 (1972)

72 QUI/KNE Quick, L. M., Knecht, D. A., and Back, M. H., "Kinetics of the Formation of Cyclobutane from Ethylene," Int. J. Chem. Kinet. 4, 61 (1972)

72 RAY/WAD Ray, D. J. M., and Waddington, D. J., "Epoxidation of Alkenes in the Gas Phase," J. Phys. Chem. 76, 3319 (1972)

72 RID/DAV Ridley, B. A., Davenport, J. A., Stief, L. J., and Welge, K. H., "Absolute Rate Constant for the Reaction $H + H_2CO$," J. Chem. Phys. 57, 520 (1972)

72 ROM/SCH Rommel, H., and Schiff, H. I., "The Reactions of H Atoms with $H_2S$ and COS," Int. J. Chem. Kinetics 4, 547 (1972)

72 SCH/GET Schott, G. L., Getzinger, R. W., and Seitz, W. A., "Transient Oxygen Atom Yields in $H_2 - O_2$ Ignition and the Rate Coefficient for $O + H_2 \rightarrow OH + H$," Am. Chem. Soc. 164th Meeting (Abstracts of Papers) 164, PHYS-113 (1972)

72 SCH/WOL1 Scherzer, Von K., and Wolf, R., "Reaktionen von Methylradikalen mit 2,2,4,4-$d_4$-Diaethylketon," Z. Phys. Chemie, (Leipzig) 250, 97 (1972)

72 SCH/WOL2 Schacke, H., and Wolfrum, J., "Blitzlichtphotolyse im Stroemungssystem: Reaktionen von CN-Radikalen in Verschiedenen Schwingungszustaenden," Ber Bunsen Gesellschaft fuer Phys. Chemie 76, 1111 (1972)

72 SHA/MAS Shackleford, W. L., Mastrup, F. N., and Kreye, W. C., "Excitation and Quenching of CO Fourth Positive Chemiluminescence Due to Reactions Involving $C_2O$," J. Chem. Phys. 57, 3933 (1972)

72 SHA/WES Shapiro, J. S., and Weston, R. E. Jr., "Kinetic Isotope

Effects in the Reaction of Methyl Radicals with Molecular Hydrogen," J. Phys. Chem. 76, 1669 (1972)

72 SHI/AMA Shibatani, H., Amano, A., "Thermal Decomposition of Alkenes. I. Thermal Decomposition of 2-Pentene," Nippon Kagaku Kaishi 11, 2119 (1972)

72 SIM/GRE Simonaitis, R., Greenberg, R. I., and Heicklen, J., "The Photolysis of $N_2O$ at 2139 Å and 1849 Å," Int. J. Chem. Kinet. 4, 497 (1972)

72 SIM/HEI1 Simonaitis, R., and Heicklen, J., "Kinetics and Mechanism of the Reaction of $O(^3P)$ with Carbon Monoxide," J. Chem. Phys. 56, 2004 (1972)

72 SIM/HEI2 Simonaitis, R., and Heicklen, J., "The Reaction of OH with $NO_2$ and the Deactivation of $O(^1D)$ by CO," Int. J. Chem. Kinet. 4, 529 (1972)

72 SIM/LIS Simonaitis, R., Lissi, E., and Heicklen, J., "On the Production of $N_2O$ from the Reaction of $O(^1D)$ with $N_2$," J. Geophys. Res. 77, 4248 (1972)

72 SLA/WOO Slanger, T. G., Wood, B. J., and Black, G., "Kinetics of $O(^3P)$ + CO + M Recombination," J. Chem. Phys. 57, 233 (1972)

72 SMI Smith, M. Y., "The Effect of Nitric Oxide on the Recombination of H Atoms in Fuel-Rich Propane-Oxygen-Nitrogen Flames," Combust. and Flame 18, 293 (1972)

72 SOL Soloukhin, R. I., "Thermal Decompositin Kinetics of $N_2O$ in Shock Waves," Dokl. Phys. Chem. 207, 999 (1972); tr. of: Dokl. Akad. Nauk SSSR 207, 912 (1972)

72 STU/NIK1 Stuhl, F., and Niki, H., "Pulsed Vacuum-UV Photochemical Study of Reactions of OH with $H_2$, $D_2$, and CO Using a Resonance-Fluorescent Detection Method," J. Chem. Phys. 57, 3671 (1972)

72 STU/NIK2 Stuhl, F., and Niki, H., "Flash Photochemical Study of the Reaction OH + NO + M using Resonance Fluorescent Detection of OH," J. Chem. Phys. 57, 3677 (1972)

72 STU/NIK3 Stuhl, F., and Niki, H., "Absolute Rate Constants for the Reactions of $O(^3P)$ Atoms with $C_2H_4$ and $C_2D_4$," J. Chem. Phys. 57, 5403 (1972)

72 TAN/LAM Tan, H-S., and Lampe, F. W., "The Reaction of Ethyl Radicals with Nitric Oxide. Nitrosoethane and Triethylhydroxylamine Formation," J. Phys. Chem. 76, 3303 (1972)

72 TCH Tchen, H., "Etude Cinétique par R. P. E. des Atomes D'oxygène $^3P$ Dans la Post-Décharge," Revue de Phys. Appliquée 7, 205 (1972)

72 TED/WAI Tedder, J. M., Walton, J. C., and Winton, K. D. R., "Free Radical Addition to Olefins Part 9.-Addition of Methyl Radicals to Fluoro-Ethylenes," J. Chem. Soc., Faraday Trans. 1 68, 1866 (1972)

72 TEN/JON Teng, L., and Jones, W. E., "Kinetics of the Reactions of Hydrogen Atoms with Ethylene and Vinyl Fluoride,"

J. Chem. Soc., Faraday Trans. I 68, 1267 (1972)

72 TSA Tsang, W., "Thermal Decomposition of 3,4-Dimethylhexane, 2,2,3-Trimethylpentane, tert-Butylcyclohexane, and Related Hydrocarbons," J. Phys. Chem. 76, 143 (1972)

72 VAR/DAN Vardanyan, I. A., Dangyan, T. M., Sachyan, G. A., and Nalbandyan, A. A. B., "Rate Constant of the Reaction $HO_2$ + CO = $CO_2$ + OH," Dokl. Phys. Chem. 205, 632 (1972); tr. of Dokl. Akad. Nauk SSSR 205, 619 (1972)

72 VER/KIS Verem'ev, E. S., Kislykh, V. V., and Sidel'nikov, A. E., "Decomposition of Nitrous Oxide at Pressures of 1500-2500 atm," Kinet. and Catal. 13, 243 (1972); tr. of: Kinet. i Katal. 13, 269 (1972)

72 VOL/GOR Volman, D. H., and Gorse, R. A., "Photochemistry of the Gaseous Hydrogen Peroxide-Carbon Monoxide System: Rate Constants for Hydroxyl Radical Reactions by Competitive Kinetics," U.S. Nat. Tech. Inform. Serv., PB Rep. No. 228327/3GA; (1972)

72 WAG/ZEL1 Wagner, Von H. Gg., and Zellner, R., "Reaktionen von Wasserstoffatomen mit ungesaettigten $C_3$-Kohlenwasserstoffen. I. Die Reaktion von H-Atomen mit Propylen," Ber. Bunsenges. Phys. Chem. 76, 440 (1972)

72 WAG/ZEL2 Wagner, Von H. Gg., and Zellner, R., "Reaktionen von Wasserstoffatomen mit ungesaettigten $C_3$-Kohlenwasserstoffen. II. Die Reaktion von H-Atomen mit Methylacetylen," Ber. Bunsenges. Phys. Chem. 76, 518 (1972)

72 WAG/ZEL3 Wagner, Von H. Gg., and Zellner, R., Reaktionen von Wasserstoffatomen mit ungesaettigten $C_3$-Kohlenwasserstoffen. III. Die Reaktion von H-Atomen mit Allen," Ber. Bunsenges. Phys. Chem. 76, 667 (1972)

72 WES/DEH1 Westenberg, A. A., and DeHaas, N., "Steady-State Intermediate Concentrations and Rate Constants. Some $HO_2$ Results," J. Phys. Chem. 76, 1586 (1972)

72 WES/DEH2 Westenberg, A. A., and deHaas, N., "Measurement of the Rate Constant for H + $H_2CO$ → $H_2$ + HCO at 297-652°K," J. Phys. Chem. 76, 2213 (1972)

72 WES/DEH3 Westenberg, A. A., and deHaas, N., "Relative Rate Constants for O + HCO → OH + CO and O + HCO → H + $CO_2$," J. Phys. Chem. 76, 2215 (1972)

72 WES/DEH4 Westenberg, A. A., and DeHaas, N., "Rate Measurements on OH + NO + M and OH + $NO_2$ + M," J. Chem. Phys. 57, 5375 (1972)

72 WOR/COL Worley, S. D., Coltharp, R. N., and Potter, A. E. Jr., "Rates of Interaction of Vibrationally Excited Hydroxyl (v=9) with Diatomic and Small Polyatomic Molecules," J. Phys. Chem. 76, 1511 (1972)

72 ZAB/HAR Zabel, F., Hardy, W., and Vasatko, H., "Zur Dissoziation von $CO_2$ und Rekombination von CO mit O-Atomen," Ber Bunsen Gesellschaft fuer Phys. Chemie 76, 1111 (1972)

72 ZAS/KOG Zaslonko, I. S., Kogarko, S. M., and Mozzhukhin, E. V.,

"Mechanism of the Thermal Decomposition of Hydrazoic Acid," Kinet. and Catal. 13, 745 (1972); tr. of: Kinet. i Katal. 13, 829 (1972)

1973

73 ADE — Aders, W-K., "Reactions of H-Atoms with Alcohols," Combust. Inst. European Symp. (Sheffield, England, September 1973) Academic Press, London, 1, 19 (1973)

73 ADE/WAG1 — Aders, Von W. K., and Wagner, Gg., "Untersuchungen zur Reaktion von Wasserstoffatomen mit Acetaldehyd," Ber. Bunsenges. Phys. Chem. 77, 332 (1973)

73 ADE/WAG2 — Aders, Von W. K., und Wagner, H. Gg., "Untersuchungen zur Reaktion von Wasserstoffatomen mit Aethanol und tert. Butanol," Ber. der Bunsenges. fuer Phys. Chemie 77, 712 (1973)

73 ALF/GOL — Alfassi, Z. B., Golden, D. M., and Benson, S. W., "The Very Low-Pressure Dehydrogenation of cis-2-Butene. The Activation Energy for 1,4-$H_2$ Elimination," Int. J. Chem. Kinet. 5, 991 (1973)

73 AND/KAU1 — Anderson, J. G., and Kaufman, F., "Kinetics of the Reaction $OH(v=0) + O_3$ to $HO_2 + O_2$," U.S. Nat. Tech. Inform. Serv., AD Rep. No. 762195 (1973)

73 AND/KAU2 — Anderson, J. G., and Kaufman, F., "Kinetics of the Reaction $OH(v=0) + O_3 \rightarrow HO_2 + O_2$," Chem. Phys. Lett. 19, 483 (1973)

73 ASH/THO — Ashmead, B. V., and Thomas, J. M., "Gas-Phase Reactions between $NO_2$ and Acetylenes," Symp. Combust. 14 (Combustion Institution Pittsburgh, Pa., 1973) 493

73 ATK/CVE — Atkinson, R., and Cvetanovic, R. J., "Determination of the Rates of Hydrogen Atom Reaction with NO by a Modulation Technique," Can. J. Chem. 51, 370 (1973)

73 AZA/AND — Azatyan, V. V., and Andreeva, N. E., Intezarova, E. I., and Nersesyan, L. A., "Kinetics of the Reaction of Atomic Hydrogen with Carbon Monoxide," Arm. Khim. Zh. 26, 959 (1973)

73 AZA/BOR — Azatyan, V. V., Borodulin, R. R., and Intezarova, E. I., "Kinetics of Recombination of Atomic Hydrogen and Deuterium," Dokl. Phys. Chem. 213, 1053 (1973); tr. of: Dokl. Akad. Nauk SSSR 213, 856 (1973)

73 BAC/EBE — Bachmaier, F., Eberius, K. H., and Just, Th., "The Formation of Nitric Oxide and the Detection of HCN in Premixed Hydrocarbon-air Flames at 1 Atmosphere," Combust. Sci. and Tech. 7, 77 (1973)

73 BAC/YOK — Back, R. A. and Yokota, T., "Absolute Rate Constants for Reactions of Free Radicals in the High-Temperature Photolysis of Formamide Vapor. II. Amino Radicals," Int. J. Chem. Kinetics 5, 1039 (1973)

73 BAL/FUL — Baldwin, R. R., Fuller, A. R., Longthorn, D., and Walker, R. W., "The Oxidation of Formaldehyde as a Source of $HO_2$ Radicals," Combust. Inst. European Symp. (Sheffield, England, September 1973) Academic Press, London, 1, 70 (1973)

73 BAL/GET — Baldwin, R. R., Gethin, A., and Walker, R. W., "Reaction of

Hydrogen Atoms with Nitrous Oxide," J. Chem. Soc., Faraday Trans. I 69 352 (1973)

73 BAL/LAR Ball, M. J., Larkin, F. S., "Determination of the Rates of Atomic Reactions by the Discharge-flow Method," Nature (London) Phys. Sci. 245, 63 (1973)

73 BAL/WAL Baldwin, R. R., Walker, R. W., and Yorke, D. A., "Reaction of n-Propyl Radicals with Oxygen, Hydrogen and Deuterium," J. Chem. Soc., Faraday Trans. I 69, 826 (1973)

73 BAR/MAR Bardi, I., and Marta, F., "Investigation of the Thermal Decomposition of Acetaldehyde," Acta Phys. Chem. 19, 227 (1973)

73 BAS/LAU Bass, A. M., and Laufer, A. H., "The Methyl Radical Combination Rate Constant as Determined by Kinetic Spectroscopy," Int. J. Chem. Kinet. 5, 1053 (1973)

73 BAY/BRO Bayrakceken, F., Brophy, J. H., Fink, R. D., and Nicholas, J. E., "Flash Photolysis of 2-Methylbut-1-ene," J. Chem. Soc., Faraday Trans. I 69, 228 (1973)

73 BEV/JOH Bevan, P. L. T., and Johnson, G. R. A., "Kinetics of Ozone Formation in the Pulse Radiolysis of Oxygen Gas," J. Chem. Soc., Faraday Trans. I 69, 216 (1973)

73 BOR/SKA Borisov, A. A., Skachkov, G. I., and Oguryaev, A. A., "Ignition of $N_2O$ + NO Mixtures at High Temperature," Kinet. and Catal. 14, 247 (1973) tr. of: Kinet. i Katal. 14, 294 (1973)

73 BRA/HAC Bradley, J. N., Hack, W., Hoyermann, K., and Wagner, H. Gg., "Kinetics of the Reaction of Hydroxyl Radicals with Ethylene and with $C_3$ Hydrocarbons," J. Chem. Soc., Faraday Trans. I 69, 1889 (1973)

73 BRA/TRU Bradley, J. N., Trueman, S. P., Whytock, D. A., and Zaleski, T. A., "Electron Spin Resonance Study of the Reaction of Hydrogen Atoms with Hydrogen Sulphide," J. Chem. Soc., Faraday Trans. I 69, 416 (1973)

73 BRE/BIR Breshears, W. D., and Bird, P. F., "Precise Measurements of Diatomic Dissociation Rates in Shock Waves," Symp. Combust. 14 (Combustion Institute Pittsburgh, Pa., 1973) 211

73 BRO Brown, R. L., "A Measurement of the Rate of the Reaction N + H + M → NH + M," Int. J. Chem. Kinet. 5, 663 (1973)

73 BUR/SKI Burcat, A., Skinner, G. B., Crossley, R. W., and Scheller, K., "High Temperature Decomposition of Ethane," Int. J. Chem. Kinetics. 5, 345 (1973)

73 BUT/LEV Butt, P. K., and Levitt, B. P., "Pyrolysis of Nitrogen Dioxide in the Shock Tube," J. Chem. Soc., Faraday Trans. I 69, 1957 (1973)

73 CAM/GRA Campbell, I. M., and Gray, C. N., "Rate Constants for $O(^3P)$ Recombination and Association with $N(^4S)$," Chem. Phys. Lett. 12, 607 (1973)

73 CAS/SCH Castellano, E., und Schumacher, H. J., "Die Kinetik und der Mechanismus des Photochemischen Ozonzerfalles im Licht der Wellenlaenge 3340 A," Z. Phys. Chemie (Frankfurt am Main) 83, 54 (1973)

73 CEH/HEI Cehelnik, E., Heicklen, J., Braslavsky, S., Stockburger, L., and Mathias, E., "Photolysis of $SO_2$ in the Presence of Foreign Gases IV. Wavelength and Temperature Effects with CO," J. Photochem. 2, 31 (1973)

73 CLA/DOV1 Clark, T. C., and Dove, J. E., "Examination of Possible Non-Arrhenius Behavior in the Reactions," Can. J. Chem. 51, 2147 (1973)

73 CLA/DOV2 Clark, T. C., and Dove, J. E., "The Rate Coefficient for $CH_3 + H_2 \rightarrow CH_4 + H$ Measured in Reflected Shock Waves; A Non-Arrhenius Reaction," Can. J. Chem. 51, 2155 (1973)

73 COL/HUS Collins, R. J., Husain, D., and Donovan, R. J., "Kinetic and Spectroscopic Studies of $O_2(a^1\Delta_g)$ by Time-resolved Absorption Spectroscopy in the Vacuum Ultra-violet," J. Chem. Soc., Faraday Trans. II 69, 145 (1973)

73 COX Cox, R. A., "The Sulphur Dioxide Photosensitized cis-Trans Isomerization of Butene-2," J. Photochem. 2, 1 (1973)

73 CUL/HUC Cullis, C. F., Hucknall, D. J., and Shepherd, J. V., "Studies of the Reactions of Ethynyl Radicals with Hydrocarbons," Proc. R. Soc. Lond. A. 335, 525 (1973)

73 DAS/EMO Dastoor, P. N., and Emovon, E. U., "The Elimination Reactions of Some Alkyl Cyanides in the Gas Phase," Can. J. Chem. 51, 366 (1973)

73 DAV/nER Davis, D. D., Herron, J. T., and Huie, R. E., "Absolute Rate Constants for the Reaction $O(^3P) + NO_2 \rightarrow NO + O_2$ over the Temperature Range 230-339°K," J. Chem. Phys. 58, 530 (1973)

73 DAV/HUI Davis, D. D., Huie, R. E., and Herron, J. T., "Direct Rate Measurements showing Negative Temperature Dependence for Reaction of Atomic Oxygen with cis-2-Butene and Tetramethylethylene," J. Chem. Phys. 59, 628 (1973)

73 DAV/KLE Davis, D. D., and Klemm, R. B., "A Flash Photolysis-Resonance Fluorescence Kinetics Study of the Reactions of Ground-State Sulfur Atoms. V. Rate Parameters for the Reaction of $S(^3P)$ with cis-2-Butene and Tetramethylethylene," Int. J. Chem. Kinet. 5, 841 (1973)

73 DAV/PAY Davis, D. D., Payne, W. A., Stief, L. J., "The Hydroperoxyl Radical in Atmospheric Chemical Dynamics: Reaction with Carbon Monoxide," Science 179, 280 (1973)

73 DAV/WON Davis, D. D., Wong, W., and Lephardt, J., "A Laser Flash Photolysis-Resonance Fluorescence Kinetic Study: Reaction of $O(^3P)$ with $O_3$," Chem. Phys. Lett. 22, 273 (1973)

73 DAY/THO Day, M. J., Thompson, K., and Dixon-Lewis, G., "Some Reactions of Hydroperoxyl and Hydroxyl Radicals at High Temperatures," Symp. Combust. 14 (Combustion Institute Pittsburgh, Pa., 1973) 47

73 DEA Dean, A. M., "Dissociation of Carbon Dioxide behind Reflected

Shock Waves," J. Chem. Phys. 58, 5202 (1973)

73 DEG/DEN Degtyareva, T. G., Denisova, L. N., and Denisov, E. T., "Formation of Free Radicals in the RH + $O_2$ System. III. 2-Methyl-Butane and 2,2,4-Trimethylpentane," Kinet. and Catal. 13, 1251 (1973); tr. of: Kinet. i Katal. 13, 1400 (1973)

73 DEM DeMore, W. B., "Rate Constants for the Reactions of Hydroxyl and Hydroperoxyl Radicals with Ozone," Science 180, 735 (1973)

73 ENC/LIS Encina, M. V., and Lissi, E. A., "Reaction of Acetyl Radicals with Buta-1,3-diene," J. Chem. Soc., Faraday Trans. I 69, 1505 (1973)

73 FAL/HOA Falconer, J. W., Hoare, D. E., and Overend, R., "The Oxidation of Methane by Nitrous Oxide," Combust. and Flame 21, 339 (1973)

73 FRE/VIN Frey, H. M., and Vinall, I. C., "The Photolysis of 3,3-Dimethylbutan-2-one (Methyl t-Butyl Ketone) and the Decomposition of the Acetyl Radical," Int. J. Chem. Kinet. 5, 523 (1973)

73 FUE/TAB Fueno, T., Tabayashi, K., and Kajimoto, O., "Bimolecular Dissociation of Cyanogen behind Incident Shock Waves," J. Phys. Chem. 77, 575 (1973)

73 GAE/GLA Gaedtke, H., Glaenzer, K., Hippler, H., Luther, K., and Troe, J., "Addition Reactions of Oxygen Atoms at High Pressures," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 295

73 GAR/MAL Gardiner, W. C. Jr., Mallard, W. G., McFarland, M., Morinaga, K Owen, J. H., Rawlins, W. T., Takeyama, T., and Walker, B. G., "Elementary Reaction Rates from Post-Induction-Period Profiles in Shock-Initiated Combustion," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 61

73 GEH/HOY Gehring, M., Hoyermann, K., Schacke, H., and Wolfrum, J., "Direct Studies of Some Elementary Steps for the Formation and Destruction of Nitric Oxide in the H-N-O System," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 99

73 GEN/ZHI Genich, A. P., Zhirnov, A. A., and Manelis, G. B., "Thermal Decomposition of Ammonia at Low and High Pressures in Shock Waves," Dokl. Phys. Chem. 212, 809 (1973); tr. of: Dokl. Akad. Nauk SSSR 212, 897 (1973)

73 GER/DEM Gershenzon, Yu. M., Dement'ev, A. P., and Nalbandyan, A. A. B., "A Study of the Rate of the Thermal Dissociation of Nitric Acid by Gaseous ESR Spectroscopy," Dokl. Phys. Chem. 210, 403 (1973) tr. of: Dokl. Adad. Nauk SSSR 210, 381 (1973)

73 GET Getzinger, R. W., "Comments on Elementary Reaction Rates from Post-Induction-Period Profiles in Shock-Initiated Combustion," Symp. Combust. 14 (Combustion Institute Pittsburgh, Pa., 1973) 72

73 GHO/ELL Ghormley, J. A., Ellsworth, R. L., and Hochanadel, C. J., "Reaction of Excited Oxygen Atoms with Nitrous Oxide. Rate Constants for Reaction of Ozone with Nitric Oxide and with Nitrogen Dioxide," J. Phys. Chem. 77, 1341 (1973)

73 GOR Gorse, R. A. Jr., "Photochemistry of the Hydrogen Peroxide-

Carbon Monoxide System: Gas Phase Rate Constants for Hydroxyl Radical Reactions by Competitive Kinetics," Diss. Abstr. Int. B 34, 156 (1973)

73 GOR/LIN Gordon, R. J., and Lin, M. C., "The Reaction of Nitric Oxide with Vibrationally Excited Ozone," Chem. Phys. Lett. 22, 262 (1973)

73 GRO/HAS Growcock, F. B., Hase, W. L., and Simons, J. W., "Kinetics of Chemically Activated Ethane," Int. J. Chem. Kinet. 5, 77 (1973)

73 HAL/CRU Halberstadt, M. L., and Crump, J., "Insertion of Methylene into the Carbon-Hydrogen Bonds of the $C_1$ to $C_4$ Alkanes," J. Photochem. 1, 295 (1973)

73 HAR/JOH Harker, A. B., and Johnston, H. S., "Photolysis of Nitrogen Dioxide to Produce Transient O, $NO_3$, and $N_2O_5$," J. Phys. Chem. 77, 1153 (1973)

73 HEI/HUS1 Heidner, R. F. III., and Husain, David., "Kinetic Investigation of Electronically Excited Oxygen Atoms, $O((2^1D_2)$, by Time-Resolved Attenuation of Atomic Resonance Radiation in the Vacuum Ultra-Violet. Part 2. Collisional quenching by the Atmospheric Gases $N_2$, $O_2$, CO, $CO_2$, $H_2O$, and $O_3$," J. Chem. Soc., Faraday Trans. II 69, 927 (1973)

73 HEI/HUS2 Heidner, R. F. III., and Husain, D., "Electronically Excited Oxygen Atoms $O(2^1D_2)$. A Time-Resolved Study of the Collisional Quenching by the Gases $H_2$, $D_2$, NO, $N_2O$, $CH_4$, and $C_3O_2$ Using Atomic Absorption Spectroscopy in the Vacuum Ultraviolet," Int. J. Chem. Kinet. 5, 819 (1973)

73 HER Herbrechtsmeier, P., "Reactions of $O(^3P)$ Atoms with Unsaturated $C_3$-Hydrocarbons," Combust. Inst. European Symp. (Sheffield, England, September 1973) Academic Press, London, 1, 13 (1973)

73 HIA/BEN Hiatt, R., and Benson, S. W., "Rates of Recombination of Free Radicals. V. The tert-Butyl Radical," Int. J. Chem. Kinet. 5, 385 (1973)

73 HUI Hule, R. E. III., "A Flash Photolysis-Resonance Fluorescence Study of the Reactions of Ground State Atomic Oxygen with Several $C_2$-$C_6$ Olefins, Molecular Oxygen, and Nitrogen Dioxide," Diss. Abstr. Int. B 33, 5226 (1973)

73 HUI/HER Hule, R. E., and Herron, J. T., "Kinetics of the Reactions of Singlet Molecular Oxygen ($O_2{}^1\Delta_g$) with Organic Compounds in the Gas Phase," Int. J. Chem. Kinet. 5, 197 (1973)

73 ILL/WEL Illés, V., Welther, K., and Pleszkáts, I., "Pyrolysis of Liquid Hydrocarbons, II Overall Decomposition Rates for Liquid Hydrocarbons," Acta Chim. Acad. Sci. Hung. 78, 357 (1973)

73 INN Inn, E. C. Y., "Rate Constant for the Reaction $CO(^1\Sigma^+) + O(^3P)$ $CO_2 + 2CO_2$," J. Chem. Phys. 59, 5431 (1973)

73 IVE/HAS Iverach, D., Basden, K. S., and Kirov, N. Y., "Formation of Nitric Oxide in Fuel-Lean and Fuel-Rich Flames," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 767

73 JAM/KER James, F. C., Karr, J. A., and Simons, J. P., "Direct

Measurement of the Rate of Reaction of the Methyl Radical with Sulphur Dioxide," J. Chem. Soc., Faraday Trans. I 69, 2124 (1973)

73 JON/BAY1 Jones, I. T. N., and Bayes, K. D., "Free-Radical Formation in the O + $C_2H_2$ Reaction," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 277

73 JON/BAY2 Jones, I. T. N., and Bayes, K. D., "The Kinetics and Mechanism of the Reaction of Atomic Oxygen with Acetylene," Proc. R. Soc. Lond. A. 335, 547 (1973)

73 KLE/DAV1 Klemm, R. B., and Davis, D. D., "A Flash Photolysis Resonance Fluorescence Kinetics Study of Ground-State Sulfur Atoms. III. Rate Parameters for Reaction of S($^3$P) with Ethylene Episulfide," Int. J. Chem. Kinet. 5, 149 (1973)

73 KLE/DAV2 Klemm, R. B., and Davis, D. D., "A Flash Photolysis-Resonance Fluorescence Kinetics Study of Ground-State Sulfur Atoms. IV. Rate Parameters for Reaction of S($^3$P) with Propene and 1-Butene," Int. J. Chem. Kinet. 5, 375 (1973)

73 KNO/SCH Knoll, H., Scherzer, K., and Geiseler, G., "The Thermal Decomposition of Biacetyl," Int. J. Chem. Kinet. 5, 271 (1973)

73 KOC/NOI Kochubet, V. F., and Moin, F. B., "Kinetics of the Reaction of Atomic Hydrogen with Oxygen," Soviet Prog. in Chem. 39, 29 (1973); tr. of: Ukra. Khim. Zhurnal 39, 888 (1973)

73 KON/MAR Konar, R. S., Marshall, R. M., and Purnell, J. H., "The Self-Inhibited Pyrolysis of Isobutane," Int. J. Chem. Kinet. 5, 1007 (1973)

73 KUR Kurylo, M. J., "Kinetics of the Reactions OH(v=0) + $NH_3$ → $H_2O$ + $NH_2$ and OH(v=0) + $O_3$ → $HO_2$ + $O_2$ at 298°K," Chem. Phys. Lett 23, 467 (1973)

73 KUR/HUI Kurylo, M. J., and Huie, R. E., "Flash Photolysis Resonance Fluorescence Study of the Addition of O($^3$P) Atoms to $C_2H_4$ and $C_2D_4$ at 298°K," J. Chem. Phys. 58, 1258 (1973)

73 LAN/OLD Langford, R. E., and Oldershaw, G. A., "Mechanism of Sulfur Formation in the Flash Photolysis of Carbonyl Sulphide," J. Chem. Soc., Faraday Trans. I 69, 1389 (1973)

73 LEB/COM Le Bras, G., and Combourieu, J., "The Reactions of Atomic Hydrogen and Active Nitrogen with Hydrogen Azide," Int. J. Chem. Kinet. 5, 559 (1973)

73 LIP/MIL Lipkea, W. H., Milks, D., and Matula, R. A., "Nitrous Oxide Decomposition and its Reaction with Atomic Oxygen," Combust. Sci. and Tech. 6, 257 (1973)

73 LIS/MAS Lissi, E. A., Massiff, G., and Villa, A. E., "Oxidation of Carbon Monoxide by Methoxy-Radicals," J Chem. Soc., Faraday Trans. I 69, 346 (1973)

73 MAC/CUR MacFadden, K. O., and Currie, C. L., "Flash Photolysis Studies in a time-of-flight mass Spectrometer. I. Divinyl ether and Reactions of the vinyl and vinoxy Radicals," J. Chem. Phys. 58, 1213 (1973)

73 MAC/THR Mack, G. P. R., and Thrush, B. A., "Reaction of Oxygen Atoms with Carbonyl Compounds I. -Formaldehyde," J. Chem Soc., Faraday Trans. I 69, 208 (1973)

73 MAN/CAR Mandelman, M., Carrington, T., and Young, R. A., "Predissociation and its Inverse, using Resonance Absorption $NO(C_2\Pi)=N + O$," J. Chem. Phys. 58, 84 (1973)

73 MCK/MUL McKenzie, A., Mulcahy, M. F. R., and Steven, J. R., "Kinetics of Decay of Hydroxyl Radicals at Low Pressure," J. Chem. Phys. 59, 3244 (1973)

73 MIC/OSB Michael, J. V., Osborne, D. T., and Suess, G. N., "Reaction $H + C_2H_4$: Investigation into the Effects of Pressure, Stoichiometry, and the Nature of the Third Body Species," J. Chem. Phys. 58, 2800 (1973)

73 MIL/MAT Milks, D., and Matula, R. A., "A Single-Pulse Shock-Tube Study of the Reaction between Nitrous Oxide and Carbon Monoxide," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 83

73 MIT/LER Mitchell, D. N., and Le Roy, D. J., "Rate Constants for the Reaction $D + H_2 = DH + H$ at Low temperatures using ESR Dectection," J. Chem. Phys. 58, 3449 (1973)

73 MOR/NIK1 Morris, E. D. Jr., and Niki, H., "Reaction of Methyl Radicals with Atomic Oxygen," Int. J. Chem. Kinet. 5, 47 (1973)

73 MOR/NIK2 Morris, E. D. Jr., and Niki, H., "Reaction of Dinitrogen Pentoxide with Water," J. Phys. Chem. 77, 1929 (1973)

73 MYE Myerson, A. L., "Shock-Tube Atom Kinetics of Nitric Oxide Decomposition," Symp. Combust. 14, (Combustion Institute Pittsburgh, Pa., 1973) 219

73 PAC Pacey, P. D., "The Reaction of Methyl Radicals with Neopentane," Can. J. Chem. 51, 2415 (1973)

73 PAR/PAU Parkes, D. A., Paul, D. M., Quinn, C. P., and Robson, R. C., "The Ultraviolet Absorption by Alkylperoxy Radicals and their Mutual Reactions," Chem. Phys. Lett. 23, 425 (1973)

73 PAU/BAI Paur, R. J., and Bair, E. J., "Reaction of $NH(a^1\Delta)$ with $NH_3$," J. Photochem. 1, 255 (1973)

73 PAY/STI Payne, W. A., Stief, L. J., and Davis, D. D., "A Kinetics Study of the Reaction of $HO_2$ with $SO_2$ and NO," J. Am. Chem. soc. 95, 7614 (1973)

73 PEE/MAH1 Peeters, J., and Mahnen, G., "Reaction Mechanisms and Rate Constants of Elementary Steps in Methane-Oxygen Flames," Symp. Combust 14, (Combustion Institute Pittsburgh, Pa., 1973) 133

73 PEE/MAH2 Peeters, J., and Mahnen, G., "Structure of Ethylene-Oxygen Flames. Reaction Mechanism and Rate Constants of Elementary Reactions," Combust. Inst. European Symp. (Sheffield, England, September 1973) Academic Press, London, 1, 53 (1973)

73 PER/BEA Perona, M. J., Beadle, P. C., and Golden, D. M., "Very Low-Pressure Pyrolysis. IX. The Decomposition of Azoethane, Azoisopropane, and 2,2-Azoisobutane," Int. J. Chem. Kinet. 5, 495 (1973)

73 PER/GOL Perona, M. J., and Golden, D. M., "Very Low-Pressure Pyrolysis.

VIII. The Decomposition of Di-t-Amyl Peroxide," Int. J. Chem. Kinet. 5, 55 (1973)

73 RIC/MAR Richard, C., Martin, R., and Niclause, M., "Inhibition of Acetaldehyde Pyrolysis by Isobutene of cis- and trans-but-2-ene," J. Chim. Phys. Physicochim. Biol. 70, 1151 (1973)

73 ROS/TRA Rosenberg, C. W. Jr., and Trainor, D. W., "Observations of Vibrationally Excited $O_3$ formed by Recombination," J. Chem. Phys. 59, 2142 (1973)

73 ROT/JUS Roth, Von P., and Just, Th., "Messungen zum homogenen thermischen Zerfall von Aethylen," Ber. Bunsenges Phys. Chem. 77, 1114 (1973)

73 SCH Schott, G. L., "Further Studies of Exponential Branching Rates in Reflected-Shock Heated, Nonstoichiometric $H_2$-CO-$O_2$ Systems," Combust. and Flame 21, 357 (1973)

73 SCH/SCH1 Schacke, Von H., Schmatjko, K. J., and Wolfrum, J., "Reaktionen von Molekuelen in Definierten Schwingungszustaenden. I. Die Reaktionen CN(v") + O und CN(v") + $O_2$," Ber. Bunsenges. Phys. Chem. 77, 248 (1973)

73 SCH/SCH2 SCHMIDT, C., and Schiff, H. I., "Reactions of $O_2(^1\Delta_g)$ with Atomic Nitrogen and Hydrogen," Chem. Phys. Lett. 23, 339 (1973)

73 SHI/KIN1 Shibatani, H., and Kinoshita, H., "Thermal Decomposition of Alkenes. II. Thermal Decomposition of 1-Pentene," Nippon Kagaku Kaishi, 2, 336 (1973)

73 SHI/KIN2 Shibatani, H., and Kinoshita, H., "Thermal Decomposition of Alkenes. III. Kinetic Study of Thermal Decomposition of 1-Butene," Nippon Kagaku Kaishi, 5, 1005 (1973)

73 SHO/HEI Shortridge, R., and Heicklen, J., "Photooxidation of Azomethane," Can. J. Chem. 51, 2251 (1973)

73 SIM/BAC Simon, M., and Back, M. H., "The Kinetics of the Reaction $2C_3H_6 \rightarrow C_3H_5 + C_3H_7$," Can. J. Chem. 51, 2934 (1973)

73 SIM/HEI1 Simonaitis, R., and Heicklen, J., "Reactions of $HO_2$ with Carbon Monoxide and Nitric Oxide and of $O(^1D)$ with Water," J. Phys. Chem. 77, 1096 (1973)

73 SIM/HEI2 Simonaitis R., and Heicklen, J., "The Reaction of $O(^1D)$ with $H_2O$ and the Reaction of OH with $C_3H_6$," Int. J. Chem. Kinet. 5, 231 (1973)

73 SIM/HEI3 Simonaitis, R., and Heicklen, J., "Reaction of $HO_2$ with $O_3$," J. Phys. Chem. 77, 1932 (1973)

73 SLA/WOO Slanger, T. G., Wood, B. J., and Black, G., "Investigation of the Rate Coefficient for $O(^3P) + NO_2 \rightarrow O_2 + NO$," Int. J. Chem. Kinet. 5, 615 (1973)

73 SMI/ZEL1 Smith, I. W. M., and Zellner, R., "Rate Measurements of OH by Resonance Absorption Part 2. Reactions of OH, with

CO, $C_2H_4$ and $C_2H_2$," J. Chem. Soc., Faraday Trans. II 69, 1617 (1973)

73 SMI/ZEL2 Smith, I. W. M., and Zellner, R., "Rate Measurements of Reactions of the OH Radical with $H_2$, CO, $C_2H_4$ and $C_2H_2$ between 210°K and 460°K," Combust. Inst. European Symp. (Sheffield, England, September 1973) Academic Press, London, 1, 24 (1973)

73 SOK/NIK Sokolova N. A., Nikisha, L. V., Polyak, S. S., and Nalbandyan, A. B., "On the Rate Constant of the Reaction Between the Methyl Radical and Oxygen," Kinet. Catal. 14, 721 (1973); tr. of Kinet. and Katal. 14, 830 (1973)

73 SPI/VIL Spicer, C. W., Villa, A., Wiebe, H. A., and Heicklen, J., "Reactions of Methylperoxy Radicals with Nitric Oxide and Nitrogen Dioxide," J. Am. Chem. Soc. 95, 13 (1973)

73 STE/NIK1 Stedman, D. H., and Niki, H., "Kinetics and Mechanism for the Photolysis of Nitrogen Dioxide in Air," J. Phys. Chem. 77, 2604 (1973)

73 STE/NIK2 Stedman, D. H., and Niki, H., "Ozonolysis Rates of Some Atmospheric Gases," Environ. Lett. 4, 303 (1973)

73 STE/WU Stedman, D. H., Wu, C. H., and Niki, H., "Kinetics of Gas-Phase Reactions of Ozone with Some Olefins," J. Phys. Chem. 77, 2511 (1973)

73 STU1 Stuhl, F., "Determination of Rate Constants for the Reactions of OH with Propylene and Ethylene by a Pulsed Photolysis-Resonance Fluorescence Method," Ber. Bunsenges Phys. Chem. 77, 674 (1973)

73 STU2 Stuhl, F., "Rate Constant for the Reaction of OH with n-$C_4H_{10}$," Z. Naturforsch, A 28, 1383 (1973)

73 STU3 Stuhl, F., "Absolute Rate Constant for the Reaction OH + $NH_3$ → $NH_2$ + $H_2O$," J. Chem. Phys. 59, 635 (1973)

73 TEN/WIN Teng, L., and Winkler, C. A., "The Rate of Recombination of H Atoms in the presence of $NH_3$," Can. J. Chem. 51, 3771 (1972)

73 TIN/WES Ting, C-T., and Weston, R. E. Jr., "Kinetic Isotope Effects in Reactions of Hot Methyl Radicals with Hydrogen," J. Phys. Chem. 77, 2257 (1973)

73 TRA/HAM Trainor, D. W., Ham, D. O., and Kaufman, F., "Gas Phase Recombination of Hydrogen and Deuterium Atoms," J. Chem. Phys. 58, 4599 (1973)

73 TRU/RIC Truby, F. K., and Rice, J. K., "Methyl-Radical Association Studied by Time-Resolved Mass Spectroscopy," Int. J. Chem. Kinet. 5, 721 (1973)

73 TSA Tsang, W., "Pyrolysis of 2,4-Dimethylhexene-1 and the Stability of Isobutenyl Radicals," Int. J. Chem. Kinet. 5, 929 (1973)

73 VOM1 Vompe, G. A., "Kinetics of the Thermal Decomposition of Ammonia at High Temperatures," Russ. J. Phys. Chem. 47, 715 (1973) tr. of: Z. Fiz. Khim. 47, 1269 (1973)

73 VOM2 Vompe, G. A., "Thermal Decomposition of Methane at Low Pressures and High Temperatures," Russ. J. Phys. Chem. 47, 788 (1973) tr. of Zh. Fiz. Khim. 47, 1396 (1973)

73 WAL1 Walker, R. W., Comments on "An Assessment of Rate Data for High-Temperature System," Symp. Combust. 14 (Combustion Institute Pittsburgh, Pa., 1973) 117

73 WAL2 Walker, R. W., Comments on "Gas-Phase Oxidation of Butene-2: The Role of Acetaldehyde in the Reaction," Symp. Combust. 14 (Combustion Institute Pittsburgh, Pa., 1973) 265

73 WAS/BAY Washida, N., and Bayes, K. D., "The Rate of Reaction of Methyl Radicals with Atomic Oxygen," Chem. Phys. Lett. 23, 373 (1973)

73 WAT/THO Watkins, K. W., and Thompson, W. W., "Addition of Ethyl Radicals to Carbon Monoxide. Kinetic and Thermochemical Properties of the Propionyl Radical," Int. J. Chem. Kinet. 5, 791 (1973)

73 WES/DEH1 Westenberg, A. A., and DeHaas, N., "Rates of CO + OH and $H_2$ + OH over an Extended Temperature," J. Chem. Phys. 58, 4061 (1973)

73 WES/DEH2 Westenberg, A. A., and DeHaas, N., "Rate of the Reaction OH + OH → $H_2O$ + O," J. Chem. Phys. 58, 4066 (1973)

73 WES/DEH3 Westenberg, A. A., and DeHaas, N., "Rate of the Reaction OH + $H_2S$ → SH + $H_2O$ over an extended Temperature Range," J. Chem. Phys. 59, 6685 (1973)

73 WIE/HEI Wiebe, H. A., and Heicklen, J., "Photolysis of Methyl Nitrite," J. Am. Chem. Soc. 95, 1 (1973)

73 WIE/VIL Wiebe, H. A., Villa, A., Hellman, T. M., and Heicklen, J., "Photolysis of Methyl Nitrite in the Presence of Nitric Oxide, Nitrogen Dioxide, and Oxygen," J. Am. Chem. Soc. 95, 7 (1973)

73 WU/MOR Wu, C. H., Morris, E. D. Jr., and Niki, H., "The Reaction of Nitrogen Dioxide with Ozone," J. Phys. Chem. 77, 2507 (1973)

73 YOK/BAC Yokota, T., and Back, R. A., "Absolute Rate Constants for Reactions of Free Radicals in the High-Temperature Photolysis of Formamide Vapor. Part I. Carbamyl Radicals," Int. J. Chem. Kinet. 5, 37 (1973)

1974

74 AL'T Al'tshuler, B. N., "Investigation of the High-Temperature Pyrolysis of Acetylene," Kinet. and Catal. 15, 748 (1974); tr. of: Kinet. i Katal. 15, 835 (1974)

74 AND/MAR Anderson, J. G., Margitan, J. J., and Kaufman, F., "Gas Phase Recombination of OH with NO and $NO_2$," J. Chem. Phys. 60, 3310 (1974)

74 ATK/PIT1 Atkinson, R., and Pitts, J. N. Jr., "Temperature Dependence of the Reaction Rate Constants for $O(^3P)$Atoms with $C_2H_4$, $C_3H_6$ and $NO(M=N_2O)$, Determined by a Modulation Technique," Chem. Phys. Lett. 27, 467 (1974)

74 ATK/PIT2 Atkinson, R., and Pitts, J. N. Jr., "Absolute Rate Constants for the Reaction of $O(^3P)$ Atoms with Selected Alkanes, Alkenes, and Aromatics as Determined by a Modulation Technique," J. Phys. Chem. 78, 1780 (1974)

74 ATK/PIT3 Atkinson, R., and Pitts, J. N. Jr., "Rate Constants for the Reaction of $O(^3P)$ Atoms with $SO_2(M=N_2O)$ over the Temperature Range 299-392K," Chem. Phys. Lett. 29, 28 (1974)

74 BAB/DEA Baber, S. C., and Dean, A. M., "Reaction of Atomic Oxygen with Carbon Dioxide behind Reflected Shock Waves," J. Chem. Phys. 60, 307 (1974)

74 BAK/NOV Bakh, G., Novak, Z., Korochuk, S. I., and Kalinenko, R. A., "The Role of Hydrogen Atoms and Methyl Radicals in the Pyrolysis of Mixtures of Alkane and Alkene Hydrocarbons," Kinet. and Catal. 15, 983 (1974); tr. of: Kinet. i Katal. 15, 1103 (1974)

74 BAL/FUL Baldwin, R. R., Fuller, A. R., Longthorn, D., and Walker, R. W., "Oxidation of Formaldehyde in KCl-coated Vessels," J. Chem. Soc., Faraday Trans. I 70, 1257 (1974)

74 BAM Bamkole, T. O., "The Thermal Decomposition of Alkyl Vinyl Ethers. Part III. Maximally Inhibited Decompositions of n-Propyl, Isobutyl, and 2-Methoxyethyl Vinyl Ethers," J. Chem. Soc. Perkin Trans. II 801 (1974)

74 BAS/ORA Bashkin, A. S., Oraevskii, A. N., Porodinkov, O. E., and Yuryshev, N. N., "Measurement of the Rate Constants of Molecular Processes in $O_3 + D_2 + CO_2$ by a Laser Method," High Energy Chem. 8, 440 (1974); tr. of: Khim. Vys. Energii 8, 513 (1974)

74 BAT/MIL Batt, L., and Milne, R. T., "Pyrolysis of Alkyl Nitrites (RONO)," Int. J. Chem. Kinet. 6, 945 (1974)

74 BAU/YAD Bauer, S. H., Yadava, B. P., and Jeffers, P., "Relative Cis-Trans Isomerization Rates. Another Test of the Energy Randomization Hypothesis," J. Phys. Chem. 78, 770 (1974)

74 BEC/SCH Becker, K. H., Schurath, U., and Seitz, H., "Ozone-Olefin Reactions in the Gas Phase I. Rate Constants and Activation Energies," Int. J. Chem. Kinet. 6, 725 (1974)

74 BEM/CLY Bemand, P. P., Clyne, M. A. A., and Watson, R. T., "Atomic Resonance Fluorescence and Mass Spectrometry for Measurements of the Rate Constants for Elementary Reactions: $O^3P_J + NO_2 \rightarrow NO + O_2$ and $NO + O_3 \rightarrow NO_2 + O_2$," J. Chem. Soc., Faraday Trans. II 70, 564 (1974)

74 BRA/KUR Braun, W., Kurylo, M. J., Kaldor, A., and Wayne, R. P., "Infrared Laser Enhanced Reactions: Spectral Distribution of the $NO_2$ Chemiluminiscence Produced in the Reaction of Vibrationally excited $O_3$ with NO," J. Chem. Phys. 61, 461 (1974)

74 [illegible]D/WIC Cadle, R. D., Wickman, H. H., Hall, C. B., and Eberle,

K. M., "The Reaction of Atomic Oxygen with Formaldehyde, Crotonaldehyde, and Dimethyl Sulfide," Chemosphere 3, 115 (1974)

74 CAM/MAR Camilleri, P., Marshall, R. M., and Purnell, J. H., "Reaction of Hydrogen Atoms with Ethane," J. Chem. Soc., Faraday Trans. I 70, 1434 (1974)

74 CAR/TAR Carter, W. P. L., and Tardy, D. C., " Homoallylic Isomerization of 1-Penten-4-yl and the Critical Energy for Methyl + 1,3-Butadiene," J. Phys. Chem. 78, 1245 (1974)

74 CHA/WAY Chapman, C. J., and Wayne, R. P., "The Reaction of Atomic Oxygen and Hydrogen with Nitric Acid," Int. J. Chem. Kinet. 6, 617 (1974)

74 CHO/BEA Choo, K. Y., Eeadle, P. C., Piszkiewicz, L. W., and Golden, D. M., "An Absolute Measurement of the Rate Constant for t-Butyl Radical Recombination," Am. Chem. Soc. 168th Nat. Meet. (Abstracts of Papers) 168, PHYS-14 (1974)

74 CHO/GOL Choo, K-Y., Golden, D. M., and Benson, S. W., "Very Low-Pressure Pyrolysis (VLPP) of t-Butylmethyl Ether," Int. J. Chem. Kinet. 6, 631 (1974)

74 CHO/MEN Choo, K. Y., Mendenhall, G. D., Golden, D. M., and Benson, S. W., "The Pyrolysis of 2-Nitrosoisobutane and the Bond Dissociation Energies of Nitroso Compounds," Int. J. Chem. Kinet. 6, 813 (1974)

74 CLY/DOW Clyne, M. A. A., and Down, S., "Kinetic Behaviour of OH $X^2\Pi$ and $A^2\Sigma^+$ using Molecular Resonance Fluorescence Spectrometry," J. Chem. Soc., Faraday Trans. II 70, 253 (1974)

74 COX1 Cox, R. A., "The Photolysis of Gaseous Nitrous Acid," J. Photochem. 3, 175 (1974)

74 COX2 Cox, R. A., "The Photolysis of Nitrous Acid in the Presence of Carbon Monoxide and Sulphur Dioxide," J. Photochem. 3, 291 (1974)

74 DAV/FIS Davis, D. D., Fischer, S., and Schiff, R., "Flash Photolysis-Resonance Fluorescence Kinetics Study: Temperature Dependence of the Reactions OH + CO → $CO_2$ + H and OH + $CH_4$ → $H_2O$ + $CH_3$," J. Chem. Phys. 61, 2213 (1974)

74 DAV/MCG Davis, M. G., McGregor, W. K., and Mason, A. A., "OH Chemiluminescent Radiation from Lean Hydrogen-Oxygen Flames," J. Chem. Phys. 61, 1352 (1974)

74 DAV/PRU Davis, D. D., Prusazcyk, J., Dwyer, M., and Kim, P., "A Stop-Flow Time-of-Flight Mass Spectrometry Kinetics Study. Reaction of Ozone with Nitrogen Dioxide and Sulfur Dioxide," J. Phys. Chem. 78, 1775 (1974)

74 DAV/WON Davis, D. D., Wong, W., and Schiff, R., "A Dye Laser Flash Photolysis Kinetics Study of the Reaction of Ground-State Atomic Oxygen with Hydrogen Peroxide," J. Phys. Chem. 78, 463 (1974)

74 DEM/CAL Demerjian, K. L., Calvert, J. G., and Thorsell, D. L.,

"A Kinetic Study of the Chemistry of the $SO_2$ ($^3B_1$) Reactions with cis-and trans-2-Butene," Int. J. Chem. Kinet. 6, 829 (1974)

74 DEM/TSC DeMore, W. B., and Tschuikow-Roux, E., "Temperature Dependence of the Reactions of OH and $HO_2$ with $O_3$," J. Phys. Chem. 78, 1447 (1974)

74 DIA/WAD Diaz, R. R., and Waddington, D. J., "Epoxidation of Alkenes in the Gas Phase II: Determination of Rate Constants for the Reaction between Alkenes and Peracetyl Radicals in the Gas Phase," Arch. Procesow Spalania 5, 399 (1974)

74 DIX/SKI1 Dixon, D. J., Skirrow, G., and Tipper, C. F. H., "Low Temperature Gas-Phase Oxidation of Aldehydes. Part 1. The Reaction Below 120°C," J. Chem. Soc., Faraday Trans. I 70, 1078 (1974)

74 DIX/SKI2 Dixon, D. J., Skirrow, G., and Tipper, C. F. H., "Low Temperature Gas-Phase Oxidation of Aldehydes. Part 2. Retardation by Formaldehyde above 120°C," J. Chem. Soc., Faraday Trans. I 70, 1090 (1974)

74 DOV/NIP Dove, J. E., and Nip, W. S., "Shock Tube Studies of the Reactions of Hydrogen Atoms. I. The Reaction $H + NH_3 \rightarrow H_2 + NH_2$," Can. J. Chem. 52, 1171 (1974)

74 EGG/VIT1 Egger, K. W., and Vitins, P., "Thermochemical Kinetics of Nitrogen Compounds. V. The Unimolecular Thermal Decomposition of Diallylamine in the Gas Phase," Int. J. Chem. Kinet. 6 371 (1974)

74 EGG/VIT2 Egger, K. W., and Vitins, P., "The Thermochemical Kinetics of Retro- "Ene" Reactions of Molecules with the General Structure (Allyl) XYH in the Gas Phase. IX. The Thermal Unimolecular Decomposition of Ethylallylether in the Gas Phase," Int. J. Chem. Kinet. 6, 429 (1974)

74 ENG/COR England, C., and Corcoran, W. H., "Kinetics and Mechanisms of the Gas-Phase Reaction of Water Vapor and Nitrogen Dioxide," Ind. and Eng. Chem., Fund. 13, 373 (1974)

74 FIN/PIT Finlayson, B. J., Pitts, J. N.Jr., and Atkinson, R., "Low-Pressure Gas-Phase Ozone-Olefin Reaction. Chemiluminescence, Kinetics, and Mechanims," J. Am. Chem. Soc. 96, 5356 (1974)

74 FUR/ATK Furuyama, S., Atkinson, R., Colussi, A. J., and Cvetanovic, R. J., "Determination by the Phase Shift Method of the Absolute Rate Constants of Reactions of O($^3P$) Atoms with Olefins at 25°C," Int. J. Chem. Kinet. 6, 741 (1974)

74 GAR/MAL Gardiner, W. C. Fr., Mallard, W. G., and Owen, J. H., "Rate Constant of OH + $H_2$ = $H_2O$ + H from 1350 to 1600K," J. Chem. Phys. 60, 2290 (1974)

74 GEN/ZHI Genich, A. P., Zhirnov, A. A., and Manelis, G. B., "Decomposition of Hydrazine behind Reflected Shock Waves at High Pressures," Russ. J. Phys. Chem. 48, 416 (1974) tr. of: Z. Fiz. Khim. 48, 728 (1974)

74 GHO/ELL Ghormley, J. A., Ellsworth, R. L., and Hochanadel, C. J., Erratum to:

"Reaction of Excited Oxygen Atoms with Nitrous Oxide. Rate Constants for Reaction of Ozone with Nitric Oxide and Nitrogen Dioxide," J. Phys. Chem. 78, 2698 (1974)

74 GLA/TRO1 Glaenzer, K., and Troe, J., "Thermal Decomposition of Nitrocompounds in Shock Waves. IV: Decomposition of Nitric Acid," Ber. Bunsenges fuer Phys. Chem. 78, 71 (1974)

74 GLA/TRO2 Glaenzer, K., and Troe, J., "Reactions of Alkyl Radicals in the Shock Wave-Induced Pyrolysis of Nitroalkanes," Ber. Bunsenges. Phys. Chem. 78, 182 (1974)

74 GOL/ALF Golden, D. M., Alfassi, Z. B., and Beadle, P. C., "Very Low-Pressure Pyrolysis (VLPP) of Alkanes: n-Butane, 2,3-Dimethylbutane, 2,2′,3,3′-Tetramethylbutane, and Isobutane," Int. J. Chem. Kinet. 6, 359 (1974)

74 GOL/PIS Golden, D. M., Piszkiewicz, L. W., Perona, M. J., and Beadle, P. C., "An Absolute Measurement of the Rate Constant for Isopropyl Radical Combination," J. Am. Chem. Soc. 96, 1645 (1974)

74 GOR/VOL Gorse, R. A., and Volman, D. H., "Photochemistry of the Gaseous Hydrogen Peroxide-Carbon Monoxide System. II: Rate Constants for Hydroxyl Radical Reactions with Hydrocarbons and for Hydrogen Atom Reactions with Hydrogen Peroxide," J. Photochem. 3, 115 (1974)

74 GRA/JOH Graham, R. A., and Johnston, H. S., "Kinetics of the Gas-Phase Reaction between Ozone and Nitrogen Dioxide," J. Chem. Phys. 60, 4628 (1974)

74 HAC/HOY1 Hack, Von W., Hoyermann, K., und Wagner, H. Gg., "Reaktionen des Hydroxylradikals mit Ammoniak und Hydrazin in der Gasphase," Ber. Bunsenges. Phys. Chem. 78, 386 (1974)

74 HAC/HOY2 Hack, W., Hoyermann, K., und Wagner, H. Gg., "Ueber einige Radikalreaktionen im H-O-N-System," Z. Naturfor. Teil A. 29, 1236 (1974)

74 HAN/FLO Hanson, R. K., Flower, W. L., and Kruger, C. H., "Determination of the Rate Constant for the Reaction $O + NO \rightarrow N + O_2$," Combust. Sci. Tech. 9, 79 (1974)

74 HAR/VAS Hardy, Von W. A., Vasatko, H., Wagner, H. Gg., und Zabel, F., "Neuere Untersuchungen zum Thermischen Zerfall von $CO_2$ 1. Teil," Ber. Bunsenges. Phys. Chem. 78, 76 (1974)

74 HAV Havel, J. J., "Atomic Oxygen. I. The Reactions of Allenes with Oxygen ($^3P$) Atoms," J. Am. Chem. Soc. 96, 530 (1974)

74 HER/HUI Herron, J. T., and Huie, R. E., "Rate Constants for the Reactions of Ozone with Ethene and Propene, from 235.0 to 362.0 K," J. Phys. Chem. 78, 2085 (1974)

74 HOW/EVE Howard, C. J., and Evenson, K. M., "Laser Magnetic Resonance Study of the Gas Phase Reactions of OH with CO, NO, and $NO_2$," J. Chem. Phys. 61, 1943 (1974)

74 HUG/MAR Hughes, D. G., Marshall, R. M., and Purnell, J. H., "Rate

Constants for the Initiation of n-Butane Pyrolysis and for the Recombination of Ethyl Radicals," J. Chem. Soc., Faraday Trans. I 70, 594 (1974)

74 HUI/HER Hule, R. E., and Herron, J. T., "The Rate Constant for the Reaction $O_3 + NO_2 \rightarrow O_2 + NO_3$ over the Temperature Range 259-362°K," Chem. Phys. Lett. 27, 411 (1974)

74 HUS/KIR Husain, D., and Kirsch, L. J., "A Kinetic Study of $C(2^1S_0)$ in the Photolysis of $C_3O_2$ by Atomic Absorption Spectroscopy," J. Photochem. 2, 297 (1974)

74 IBU/MUR Ibuki, T., Murata, T., and Takezaki, Y., "Isomerization of Chemically Activated Propenyl Radicals," J. Phys. Chem. 78, 2543 (1974)

74 INN Inn, E. C. Y., "Rate of Recombination of Oxygen Atoms and CO at Temperatures below Ambient," J. Chem. Phys. 61, 1589 (1974)

74 JAF/WAN Jaffe, S., and Wan, E., "Thermal and Photochemical Reactions of $NO_2$ with Butyraldehyde in Gas Phase," Env. Sci. Tech. 8, 1024 (1974)

74 JAM/SIM James, F. C., and Simons, J. P., "Yet Another Direct Measurement of the Rate Constant for the Recombination of Methyl Radicals," Int. J. Chem. Kinet. 6, 887 (1974)

74 JAP/WU Japar, S. M., Wu, C. H., and Niki, H., "Rate Constants for the Reaction of Ozone with Olefins in the Gas Phase," J. Phys. Chem. 78, 2318 (1974)

74 JEF/BAU Jeffers, P., and Bauer, S. H., "The Homogeneous Pyrolysis of 2-Butenes," Int. J. Chem. Kinet. 6, 763 (1974)

74 KAL/BRA Kaldor, A., Braun, W., and Kurylo, M. J., "Infrared Laser Enhanced Reactions: $O_3 + SO$," J. Chem. Phys. 61, 2496 (1974)

74 KAL/SHE Kalinenko, R. A., Shevel'kova, L. V., and Lavrovskii, K. P., "Method of Determining Rate Constants of Hydrogen Atom Reactions During Cracking Processes," Kinet. and Catal. 15, 1 (1974) tr. of Kinet. i Katal. 15, 7 (1974)

74 KEW/HOR Kewley, D. J., and Hornung, H. G., "Free-Piston Shock-Tube Study of Nitrogen Dissociation," Chem. Phys. Lett. 25, 531 (1974)

74 KLE/DAV Klemm, R. B., and Davis, D. D., "A Flash Photolysis-Resonance Fluorescence Kinetics Study of the Reaction $S(^3P) + OCS$," J. Phys. Chem. 78, 1137 (1974)

74 KLE/STI Klemm, R. B., and Stief, L. J., "Absolute Rate Parameters for the Reaction of Ground State Atomic Oxygen with Carbonyl Sulfide," J. Chem. Phys. 61, 4900 (1974)

74 KOB/PAC Kobrinsky, P. C., and Pacey, P. D., "The Reaction of Methyl Radicals with Molecular Hydrogen," Can. J. Chem. 52, 3665 (1974)

74 KON Kondratiev, V. N., "On the Rate of $CO + O$ Recombination," React. Kinet. and Catal. Lett. 1, 7 (1974)

74 KUR/BRA Kurylo, M. J., Braun, W., Kaldor, A., Freund, S. M., and Wayne, R. P., "Infra-Red Laser Enhanced Reactions: Chemistry of Vibrationally Excited $O_3$ with NO and $O_2(^1\Delta)$," J. Photochem 3, 71 (1974)

74 LAU/BAS Laufer, A. H., Bass, A. M., "Rate Constants for Reactions of Methylene with Carbon Monoxide, Oxygen, Nitric Oxide and Acetylene," J. Phys. Chem. 78, 1344 (1974)

74 LAU/BUE Laupert, R., and Buenau, G. von., "Untersuchung Konkurrierender Reaktionen in stroemenden Kohlenwasserstoff-Gemischen," Z. Naturforsch Teil A. 29, 642 (1974)

74 MAC/THR1 Mack, G. P. R., and Thrush, B. A., "Reaction of Oxygen Atoms with Carbonyl Compounds. Part 2. Acetaldehyde," J. Chem. Soc., Faraday Trans. I 70, 178 (1974)

74 MAC/THR2 Mack, G. P. R. and Thrush, B. A., "Reaction of Oxygen Atoms with Carbonyl Compounds Part 3.-Ketene," J. Chem. Soc., Faraday Trans. I 70, 187 (1974)

74 MAG/IOA Magaril, R. Z., and Ioanidis, N. B., "Kinetics and Mechanism of the Thermal Decomposition of Hept-1-ene," Russ. J. Phys. Chem. 48, 498 (1974); tr. of: Z Fiz. Khim. 48, 865 (1974)

74 MAL/OWE Mallard, W. G., and Owen, J. H., "Rate Constant for H + H + Ar = $H_2$ + Ar from 1300 to 1700K," Int. J. Chem. Kinet. 6, 753 (1974)

74 MAR/KAU Margitan, J. J., Kaufman, F., and Anderson, J. G., "The Reaction of OH with $CH_4$," Geophys. Res. Lett. 1, 80 (1974)

74 MCC McClenny, W. A., "Determination of Relative Rates for Oxygen Atom-Hydrocarbon Reactions by Reduction of Oxygen Atom, Nitric Oxide Chemiluminescence," J. Chem. Phys. 60, 793 (1974)

74 MEA/KIM Meagher, J. F., Kim, P., Lee, J. H., and Timmons, R. B., "Kinetic Isotope Effects in the Reactions of Hydrogen and Deuterium Atoms with Dimethyl Ether and Methanol," J. Phys. Chem. 78, 2650 (1974)

74 MIC/PAR Michaud, P., Paraskevopoulos, G., and Cvetanovic, R. J., "Relative Rates of the Reactions of $O(^1D_2)$ Atoms with Alkanes and Cycloalkanes," J. Phys. Chem. 78, 1457 (1974)

74 MOR/NIK Morris, E. D. Jr., Niki, H., "Reaction of the Nitrate Radical with Acetaldehyde and Propylene," J. Phys. Chem. 78, 1337 (1974)

74 MOS/POI Moshkina, R. I., Polyak, S. S., Masterovoi, L. F., and Naltandyan, A. B., "Mechanism of the Ethane Oxidation," Kinet. and Catal. 15, 250 (1974); tr. of: Kinet. i Katal. 15, 282 (1974)

74 NAM/TRO Namoradze, M. A., Troshin, A. F., Azatyan, V. V., Dzotsenidze, Z. G., and Museridze, M. D., "Effect of Initial Conditions on the Intensity of Chemiluminescence during Carbon Monoxide Oxidation," Soobshch. Akad. Nauk Gruz. SSR 73, 377 (1974)

74 PAS/CAR Pastrana, A. V., and Carr, R. W. Jr., "Rate of the Reaction of Hydroxyl Radical with Acetylene, Int. J. Chem. Kinet. 6, 587 (1974)

74 PIL/WAG Pilz, C., und Wagner, H. Gg., "Die Reaktion von $O(^3P)$-Atomen mit Kohlensuboxid," Z. Phys. Chem. (Frankfurt am Main) 92, 323 (1974)

74 PØH/LEI Pohjonen, M. L., Leinonen, L., Lemmetyinen, H., and Koskikallio, J., "Flash Photolysis of Acetone in Gas Phase, Kinetics of Ethane Formation from Methyl Radicals," Finn. Chem. Lett. 6, 207 (1974)

74 PRA/VEL Pratt, G., and Veltman, I., "Addition of Ethyl Radicals to Nitric Øxide," J. Chem. Soc., Faraday Trans. I 70, 1840 (1974)

74 PRU/SLA Pruss, F. J. Jr., Slagle, I. R., and Gutman, D., "Determination of Branching Ratios for the Reaction of Oxygen Atoms with Ethylene," J. Phys. Chem. 78, 663 (1974)

74 RAW/GAR Rawlins, W. T., and Gardiner, W. C. Jr., "Rate Constant of $ØH + ØH = H_2Ø + Ø$ from 1500 to 2000 K," J. Chem. Phys. 60, 4676 (1974)

74 RØS/TRA Rosenberg, C. W. von Jr., and Trainor, D. W., "Vibrational Excitation of Øzone formed by Recombination," J. Chem. Phys. 61, 2442 (1974)

74 SCH/DRE Scherzer, K., and Drechsler, M., "Reaction of Methyl Radicals with 2-Butanone-1,1,1,3,3-$d_5$ and the stability of the Butanonyl Radicals," React. Kinet. Catal. Lett. 1, 79 (1974)

74 SCH/GET Schott, G. L., Getzinger, R. W., and Seitz, W. A., "Transient Øxygen Atom Yields in $H_2$-$Ø_2$ Ignition and the Rate Coefficient for $O + H_2 \rightarrow OH + H$," Int. J. Chem. Kinet. 6, 921 (1974)

74 SCH/KNØ Scherzer, K., Knoll, H., and Geiseler, G., "Thermische und durch Methylradikale initiierte Spaltung von Pentandion-(2,3) bei geringen Umsaetzen," J. Prakt. Chem. 316, 415 (1974)

74 SCH/SCH Schacke, H., Schwatjko, K., and Wolfrum, J., "Reaktionen von CN-Radikalen im H-C-N-Ø-System," Arch. Pro. Spalania 5, 363 (1974)

74 SHI/AMA Shibatani, H., and Amano, A., "Thermal Decomposition of 2-Methyl-2-Pentene, 3-Methyl-2-Pentene, 2-Methyl-1-Pentene, 2-Methyl-1-Butene and 2-Methyl-2-Butene," Sekiyu Gakkai Shi 17, 136 (1974)

74 SIM/HEI1 Simonaitis, R., and Heicklen, J., "The Mechanism of the $H_2Ø$-Catalyzed Chain Photodecomposition of $Ø_3$ and the Reaction of HO with $O_3$," J. Photochem. 2, 309 (1974)

74 SIM/HEI2 Simonaitis, R., and Heicklen, J., "Reaction of $HØ_2$ with NØ and $NO_2$," J. Phys. Chem. 78, 653 (1974)

74 SIM/HEI3 Simonaitis, R., and Heicklen, J., "Reactions of $CH_3O_3$ with NØ and $NØ_2$," J. Phys. Chem. 78, 2417 (1974)

74 SLA/GIL Slagle, I. R., Gilbert, J. R., and Gutman, D., "Kinetics of the Reaction between Øxygen Atoms and Carbon Disulfide,"

J. Chem. Phys. 61, 704 (1974)

74 SLA/PRU Slagle, I. R., Pruss, F. J. Jr., and Gutman, D., "Kinetics into the Steady State. I. Study of the Reaction of Oxygen Atoms with Methyl Radicals," Int. J. Chem. Kinet. 6, 111 (1974)

74 SMI/ZEL Smith, I. W. M., and Zellner, R., "Rate Measurements of Reactions of OH by Resonance Absorption. Part 3. Reactions of OH with $H_2$, $D_2$ and Hydrogen and Deuterium Halides," J. Chem. Soc., Faraday Trans. II 70, 1045 (1974)

74 SNE Snelling, D. R., "The Ultraviolet Flash Photolysis of Ozone and the Reactions of $O(^1D)$ and $O_2(^1\Sigma_g^+)$," Can. J. Chem. 52, 257 (1974)

74 SPR/AKI Sprung, J. L., Akimoto, H., and Pitts, J. N. Jr., "Nitrogen Dioxide Catalyzed Geometric Isomerization of Olefins. Isomerization Kinetics of the 2-Butenes and the 2-Pentenes," J. Am. Chem. Soc. 96, 6549 (1974)

74 STE/ALV Stedman, D. H., Alvord, H., and Baker-Blocker, A., "Chemiluminescent Reactions of Disulfur Monoxide," J. Phys. Chem. 78, 1248 (1974)

74 STU Stuhl, F., "Determination of the Rate Constant for the Reaction OH + $H_2S$ by a Pulsed Photolysis-Resonance Fluorescence Method," Ber. Bunsenges. Phys. Chem. 78, 230 (1974)

74 SZI/MÁR Szirovicza, L., and Márta, F., "Kinetics of the Decomposition of Ethane Sensitized by Azoisopropane," React. Kinet. Catal. Lett. 1, 417 (1974)

74 SZI/WAL Szirovicza, L., and Walsh, R., "Gas Phase Addition of HI to Ketene and the Kinetics of Decomposition of the Acetyl Radical," J. Chem. Soc., Faraday Trans. I 70, 33 (1974)

74 TIT/BAL Titarchuk, T. A., Ballod, A. P., Prokhortseva, N. G., and Shtern, V. Ya., "Determination of the Rate Constant of the Reaction between the Methyl Radical and Nitric Oxide from the Reaction Product-Nitrosomethane," Kinet. and Catal. 15, 1217 (1974); tr. of: Kinet. i Katal. 15, 1375 (1974)

74 TOB/TOB Toby, F. S., and Toby, S., "Reaction between Ozone and Allene in the Gas Phase," Int. J. Chem. Kinet. 6, 417 (1974)

74 TRA Trafton, W. E. Jr., "High Temperature Gas Phase Kinetic Studies of Carbonyl Sulfide, Nitrous Oxide, and Carbon Disulfide in a Shock Tube with Boundary Layer Corrections," Diss. Abstr. Int. B 34, 5935 (1974)

74 TRA/ROS1 Trainor, D. W., and Rosenberg, C. W. von Jr., "Flash Photolysis Study of the Gas Phase Recombination of Hydroxyl Radicals," J. Chem. Phys. 61, 1010 (1974)

74 TRA/ROS2 Trainor, D. W., and Rosenberg, C. W. von. Jr., "Energy Partitionirg in the Reaction OH + CO → $CO_2$ + H," Chem. Phys. Lett. 29, 35 (1974)

74 VID/WIL Vidyarthi, S. K., Willis, C. Back, R. A., and McKitrick, R. M., "The Reaction of Diimide with Olefins in the Gas Phase," J. Am. Chem. Soc. 96, 7647 (1974)

74 WAG/ZAB Wagner, H. Gg., and Zabel, F., "Neuere Untersuchungen zum Thermischen Zerfall von $CO_2$. Teil II," Ber. Bunsenges. fuer Phys. Chemie 72, 705 (1974)

74 WAS/MAR Washida, N., Martinez, R. I., and Bayes, K. D., "The Oxidation of Formyl Radicals," Z. Naturforschung A 29, 251 (1974)

74 WAT/WOR Watkins, K. W., and Word, W. W., "Addition of Methyl Radicals to Carbon Monoxide+ Chemically and Thermally Activated Decomposition of Acetyl Radicals," Int. J. Chem. Kinet. 6, 855 (1974)

74 WIE/PAR Wiebe, H. A., and Paraskevopoulos, G., "The Effect of the Excess Kinetic Energy of the $O(^1D)$ Atoms from the Flash Photolysis of $N_2O$ on their Reaction with $N_2O$," Can. J. Chem. 52, 2165 (1974)

74 WON/DAV Wong, W., and Davis, D. D., "A Flash Photolysis-Resonance Fluorescence Study of the Reaction of Atomic Hydrogen with Molecular Oxygen $H + O_2 + M \rightarrow HO_2 + M$," Int. J. Chem. Kinet. 6, 401 (1974)

74 YAM1 Yampol'skii, Yu. P., "Determination of the Rate Constant of the Reaction $H + C_2D_4 \rightarrow C_2D_3H + D$," Bull. of Acad. of Sci. of USSR, Div. Chem. Sci. 23, 538 (1974); tr. of: Izv. Akad. Nauk SSSR, Ser. Kim. 3, 570 (1974)

74 YAM2 Yampol'skii, Yu. P., "Rate Constant of the Reaction $H + C_2H_4 \rightarrow H_2 + C_2H_3$," Kinet. and Catal. 15, 938 (1974); tr. of: Kinet. i Katal. 15, 1059 (1974)

74 YAM/LAV Yampol'skii, Yu. P., Lavrovskii, K. P., Makslmov, Yu. V., and Rybin, V. M., "Determination of the Rate Constant for the Reaction $H + C_2H_2 \rightarrow H_2 + C_2H$," Kinet. and Catal. 15, 9 (1974); tr. of: Kinet. i Katal. 15, 17 (1974)

74 YAM/RYB Yampolskii, Yu. P., and Rybin, V. M., "Arrhenius Parameters of the Reaction $CH_3 + C_2H_6 \rightarrow CH_4 + C_2H_5$," React. Kinet. Catal. Lett. 1, 321 (1974)

74 ZEL/SMI Zellner, R., and Smith, I. W. M., "Rate Constants for the Reactions of OH with $NH_3$ and $HNO_3$," Chem. Phys. Lett. 26, 72 (1974)

1975

75 ABU/LIS Abuin, E., and Lissi, E. A., "Arrhenius Parameters for the Photocleavage of Butan-2-one Triplets," J. Photochem. 5, 65 (1975)

75 ALB/HOY Albers, E. A., Hoyermann, K., Schacke, H., Schmatjko, K. J., Wagner, H. Gg., and Wolfrum, J., "Absolute Rate Coefficients for the Reaction of H-Atoms with $N_2O$ and some Reactions of CN Radicals," Symp. Combust. 15, (Combustion Institute Pittsburgh,

Pa., 1975) 765

75 ALC/MIL Alcock, W. G., and Mile, B., "The Gas-Phase Reactions of Alkylperoxy Radicals Generated by a Photochemical Technique," Combust. Flame 24, 125 (1975)

75 APP/APP Appel, D., and Appleton, J. P., "Shock Tube Studies of Deuterium Dissociation and Oxidation by Atomic Resonance Absorption Spectrophotometry," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 701

75 ARR/COX Arrington, C. A. Jr., and Cox, D. J., "Arrhenius Parameters for the Reaction of Oxygen Atoms, $O(^3P)$, with Propyne," J. Phys. Chem. 79, 2584 (1975)

75 ASH/OGR Ashford, R. D., and Ogryzlo, E. A., "Temperature Dependence of some Reactions of Singlet Oxygen with Olefins in the Gas Phase," J. Am. Chem. Soc. 97, 3604 (1975)

75 ATK/HAN1 Atkinson, R. Hansen, D. A., and Pitts, J. N. Jr., "Rate Constants for the Reaction of the OH Radical with $H_2$ and NO (M=Ar and $N_2$)," J. Chem. Phys. 62, 3284 (1975)

75 ATK/HAN2 Atkinson, R., Hansen, D. A., and Pitts, J. N. Jr., "Rate Constants for the Reaction of OH Radicals with $CHF_2Cl$, $CF_2Cl_2$, $CFCl_3$, and $H_2$ over the Temperature Range 297-434°K," J. Chem. Phys. 63, 1703 (1975)

75 ATK/PIT Atkinson, R. and Pitts, J. N. Jr., "Rate Constants for the Reaction of OH Radicals with Propylene and the Butenes over the Temperature Range 297-425°K," J. Chem. Phys. 63, 3591 (1975)

75 AZA/ALE Azatyan, V. V., Aleksandrov, E. N., and Troshin, A. F., "Chain Initiation Rate in the Reactions of Hydrogen and Deuterium with Oxygen," Kinet. and Catal. 16, 261 (1975); tr. of: Kinet. i Katal. 16, 306 (1975)

75 BAB/DEA Baber, S. C., and Dean, A. M., "$N_2O$ Dissociation behind Reflected Shock Waves," Int. J. Chem. Kinet. 7, 381 (1975)

75 BAK/BAL1 Baker, R. R., Baldwin, R. R., Everett, C. J., and Walker, R. W., "The Addition of Neopentane to Slowly Reacting Mixtures of Hydrogen and Oxygen at 480°C-I: Formation of Primary Products from Neopentane," Combust. and Flame 25, 285 (1975)

75 BAK/BAL2 Baker, R. R., Baldwin, R. R., Fuller, A. R., and Walker, R. W., "Addition of n-$C_4H_{10}$ and $C_4H_8$ to Slowly Reacting Mixtures of Hydrogen and Oxygen at 480°C. Part 1. Formation of Hydrocarbon Products," J. Chem. Soc., Faraday Trans. I 71, 736 (1975)

75 BAK/BAL3 Baker, R. R., Baldwin, R. R., and Walker, R. W., "Addition of n-Butane to Slowly Reacting Mixtures of Hydrogen and Oxygen at 480°C. Part 2. Formation of Oxygenated Products," J. Chem. Soc., Faraday Trans. I 71, 756 (1975)

75 BAT/MCC Batt, L., McCulloch, R. D., and Milne, R. T., "Thermochemical and Kinetic Studies of Alkyl Nitrites (RONO)-D(RO-NO), The Reactions between RO. and NO, and the Decomposition RO.," Int. J. Chem. Kinet. 7 (Symp. 1), 441 (1975)

75 BEC/INO Becker, K. H., Inocéncio, M. A., and Schurath, U., "The Reaction of Ozone with Hydrogen Sulfide and its Organic Derivatives," Int. J. Chem. Kinet. 7 (Symp. 1), 205 (1975)

75 BEC/MAC Beck, W. H., and Mackie, J. C., "Formation and Dissociation of $C_2$ from High Temperature Pyrolysis of Acetylene," J. Chem. Soc., Faraday Trans. I 71, 1363 (1975)

75 BIO/LAZ Biordi, J. C., Lazzara, C. P., and Papp, J. F., "Flame Structure Studies of $CF_3Br$-Inhibited Methane Flames. II. Kinetics and Mechanisms," Symp. Combust. 15 (Combustion Institute Pittsburgh, Pa., 1975) 917

75 BIR/KAS Birely, J. H., Kasper, J. V. V., Hai, F., and Darnton, L. A., "The Effect of Vibrational Energy on the Reaction of Molecular Hydrogen with Atomic Oxygen," Chem. Phys. Lett. 31, 220 (1975)

75 BOW Bowman, C. T., "Non-Equilibrium Radical Concentrations in Shock-Initiated Methane Oxidation," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa. 1975) 869

75 BRA/BRO Brabbs, T. A., and Brokaw, R. S., "Shock Tube Measurements of Specific Reaction Rates in the Branched Chain $CH_4$-CO-$O_2$ System," Symp. Combust. 15 (Combustion Institute Pittsburgh, Pa. 1975) 893

75 BRA/CRA Bradley, J. N., and Craggs, P., "The Reaction of Hydrogen with Nitric Oxide at High Temperature," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 833

75 BRA/WES Bradley, J. N., and West, K. O., "Single-pulse Shock Tube Studies of Hydrocarbon Pyrolysis. Part 4. Isomerization of Allene to Methylacetylene," J. Chem. Soc., Faraday Trans. I 71, 967 (1975)

75 BUR Burcat, A., "Cracking of Propylene in a Shock Tube," Fuel 54, 87 (1975)

75 CAM/GOO1 Campbell, I. M., and Goodman, K., "Reaction of $O(^3P)$ Atoms with Nitromethane Vapour at 295 K," Chem. Phys. Lett. 34, 105 (1975)

75 CAM/GOO2 Campbell, I. M., and Goodman, K., "Rate Constants for Reactions of Hydroxyl Radicals with Nitromethane and Methyl Nitrite Vapours at 292 K," Chem. Phys. Lett. 36, 382 (1975)

75 CAM/HAN1 Campbell, I. M., Handy, B. J., and Kirby, R. M., "Gas Phase Chain Reaction of $H_2O_2$ + $NO_2$ + CO," J. Chem. Soc., Faraday Trans. I 71, 867 (1975)

75 CAM/HAN2 Campbell, I. M., and Handy, B. J., "Studies of Reactions of Atoms in a Discharge Flow Stirred Reactor. Part 1. The O + $H_2$ + NO System," J. Chem. Soc., Faraday Trans. I 71, 2097 (1975)

75 CAM/MAR Camilleri, P., Marshall, R. M., and Purnell, H., "Arrhenius Parameters for the Unimolecular Decompositions of Azomethane and n-Propyl and Isopropyl Radicals and for Methyl Radical Attack on Propane," J. Chem. Soc., Faraday Trans. I 71, 1491 (1975)

75 CAS/DAV Castleman, A. W. Jr., Davis, R. E., Munkelwitz, H. R., Tang, I. N., and Wood, W. P., "Kinetics of Association Reactions Pertaining to $H_2SO_4$ Aerosol Formation," Int. J. Chem. Kinet. 7 (Symp. 1), 629 (1975)

75 CAS/SCH Castellano, P. E., and Schumacher, H. J., "La Descomposicion Fotoquimica Del Ozono A 3200 Å," Anales Asoc. Quim. Argentina 63, 9 (1975)

75 CHE/BAC Chen, C. J., Back, M. H. and Back, R. A., "The Thermal Decomposition of Methane. I. Kinetics of the Promary Decomposition to $C_2H_6$ + $H_2$; Rate Constant for the Homogeneous Unimolecular Dissociation of Methane and its Pressure Dependence," Can. J. Chem. 53, 3580 (1975)

75 CHU/CAL Chung, K., Calvert, J. G., and Bottenheim, J. W., "The Photochemistry of Sulfur Dioxide Excited within its First Allowed Band (3130Å) and the "Forbidden" Band (3700-4000Å)," Int. J. Chem. Kinet. 7, 161 (1975)

75 CLY/MCD Clyne, M. A. A., and McDermid, I. S., "Mass Spectrometric Determinations of the Rates of Elementary Reactions of NO and of $NO_2$ with Ground State $N^4S$ Atoms," J. Chem. Soc., Faraday Trans. I 71, 2189 (1975)

75 CLY/TOW Clyne, M. A. A., and Townsend, L. W., "Rate Constant Measurements for Rapid Reactions of Ground State Sulphur $3p^4(^3P_J)$ Atoms," Int. J. Chem. Kinet. 7 (Symp. 1), 73 (1975)

75 COL/NAE Colket, M. B.,III., Naegeli, D. W. and Glassman, I., High-Temperature Pyrolysis of Acetaldehyde," Int. J. Chem. Kinet. 7, 223 (1975)

75 COW/MIC Cowfer, J. A., and Michael, J. V., "An Investigation of Nonequilibrium Kinetic Isotope Effects in Chemically Activated Ethyl Radicals," J. Chem. Phys. 62, 3504 (1975)

75 COX Cox, R. A., "The Photolysis of Gaseous Nitrous Acid-A Technique for Obtaining Kinetic Data on Atmospheric Photooxidation Reactions," Int. J. Chem. Kinet. 7, (Symp. 1), 379 (1975)

75 COX/DER1 Cox, R. A., and Derwent, R. G., "Kinetics of the Reaction of $HO_2$ with Nitric Oxide and Nitrogen Dioxide," J. Photochem. 4, 139 (1975)

75 COX/DER2 Cox, R. A., Derwent, R. G., and Holt, P. M., "The Photo-Oxidation of Ammonia in the Presence of NO and $NO_2$," Chemosphere 4, 201 (1975)

75 CRA/ROS Crane, P. M., and Rose, T. L., "Reactions of Singlet Methylene with Butadiene. High Energy Isomerizations of Vinylcyclopropane," J. Phys. Chem. 79, 403 (1975)

75 CUP/GLA Cupitt, L. T., and Glass, G. P., "Reactions of SH with Atomic

Oxygen and Hydrogen," Int. J. Chem. Kinet. 7 (Symp. 1), 39 (1975)

75 DAU/CAL Daubendiek, R. L., and Calvert, J. G., "A Study of the $N_2O_5$-$SO_2$-$O_3$ Reaction System," Environmental Lett. 8, 103 (1975)

75 DAV/FIS Davis, D. D., Fischer, S., Schiff, R., Watson, R. T., and Bolinger, W., "A Kinetic Study of the Reaction of OH Radicals with two $C_2$ Hydrocarbons: $C_2H_4$ and $C_2H_2$," J. Chem. Phys. 63, 1707 (1975)

75 DAV/THR Davidson, J. A., and Thrush, B. A., "Reaction of Oxygen Atoms with Methyl and Ethyl Nitrites," J. Chem. Soc., Faraday Trans. I 71, 2413 (1975)

75 DEM DeMore, W. B., "Rate Constant Ratio for the Reactions of OH with $O_3$ and CO," Int. J. Chem. Kinet. 7 (Symp. 1), 273 (1975)

75 DIA/SEL Diaz, R. R., Selby, K., and Waddington, D. J., "Reactions of Oxygenated Radicals in the Gas Phase. Part1. Reaction of Peracetyl Radicals and But-2-ene,"J. Chem. Soc., Perkin Trans. II 7, 758 (1975)

75 DOV/NIP Dove, J. E., Nip, W. S., and Teitelbaum, H., "The Vibrational Relaxation and Pyrolysis of Shock Heated Nitrous Oxide," Symp. Combust 15, (Combustion Institute Pittsburgh, Pa., 1975) 903

75 DUB/MCK Dubinsky, R. N., and McKenney, D. J., "Determination of the Rate Constant of the $O + H_2 \rightarrow OH + H$ Reaction using Atomic Oxygen Resonance Fluorescence and the Air Afterglow Techniques," Can. J. Chem. 53, 3531 (1975)

75 DUX/PRA Duxbury, J., and Pratt, N. H., "A Shock Tube Study of NO Kinetics in the Presence of $H_2$ and Fuel-N," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 843

75 ENG/COR England, C., and Corcoran, W. H., "The Rate and Mechanism of the Air Oxidation of Parts-per-Million Concentrations of Nitric Oxide in the Presence of Water Vapor," Ind. and Eng. Chem. Fund. 14, 55 (1975)

75 ERN/SPI Ernst, J., und Spindler, K., "Untersuchungen zum Thermischen Zerfall von Acetaldehyd und Aceton," Ber. Bunsen Gesellschaft fuer Phys. Chem. 79, 1163 (1975)

75 FLO/HAN Flower, W. L., Hanson, R. K., and Kruger, C. H., "Kinetics of the Reaction of Nitric Oxide with Hydrogen," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 823

75 GAE/TRO Gaedtke, H., and Troe, J., "Primary Processes in the Photolysis of $NO_2$," Ber Bunsen Gesellschaft fuer Phys. Chem. 79, 184 (1975)

75 GAF/ATK1 Gaffney, J. S., Atkinson, R., and Pitts, J. N. Jr., "Relative Rate Constants for the Reaction of $O(^3P)$ Atoms with Selected Olefins, Monoterpenes, and Unsaturated Aldehydes," J. Am. Chem. Soc. 97, 5049 (1975)

75 GAF/ATK2 Gaffney, J. S., Atkinson, R., and Pitts, J. N. Jr., "Temperature Dependence of the Relative Rate Constants for the

Reaction of $O(^3P)$ Atoms with Selected Olefins, Monoterpenes, and Unsaturated Aldehydes," J. Am. Chem. Soc. 97, 6481 (1975)

75 GAR/ØWE Gardiner, W. C. Jr., Øwen, J. H., Clark, T. C., Dove, J. E., Bauer, S. H., Miller, J. A., and McLean, W. J., "Rate and Mechanism of Methane Pyrolysis from 2000° to 2700°K," Symp. Combust. 15 (Combustion Institute Pittsburgh, Pa., 1975) 857

75 GAU/SNE Gauthier, M. J. E., and Snelling, D. R., "LA Photolyse de L'ozone a 253.7nm: Desactivation de $Ø(^1D)$ et de $Ø2(^1\Sigma)$ par Les Gaz de L'atmosphere," J. Photochem. 4, 27 (1975)

75 GEN/ZHI Genich, A. P., Zhirnov, A. A., and Manelis, G. B., "Decomposition of Ammonia in Shock Waves," Kinet. and Catal. 16, 726 (1975); tr. of: Kinet. i Katal. 16, 837 (1975)

75 GLA Glasson, W. A., "Methoxyl Radical Reactions in Atmospheric Chemistry," Env. Sci. and Tech. 9, 1048 (1975)

75 GLA/TØB1 Glavas, S., and Toby, S., "The Reaction between Øzone and Hydrogen Sulfide: Kinetics and Effect of Added Gases," Am. Chem. Soc. ACS Symp. Ser. 17, 122 (1975)

75 GLA/TØB2 Glavas, S., and Toby, S., "Reaction between Øzone and Hydrogen Sulfide," J. Phys. Chem. 79, 779 (1975)

75 GLA/TRO Glaenzer, K., and Troe, J., "$HØ_2$ Formation in Shock Heated $HNO_3$-$NO_2$ Mixtures," Ber. Bunsenges. Phys. Chem. 79, 465 (1975)

75 GOR/MUL1 Gordon, S., and Mulac, W. A., "Reaction of the $OH(X^2\Pi)$ Radical Produced by the Pulse Radiolysis of Water Vapor," Int. J. Chem. Kinet. (Symp. 1), 289 (1975)

75 GOR/MUL2 Gordon, S., Mulac, W., and Nangia, P., " Pulse Radiolysis of Ammonia Gas. II. Rate of Disappearance of the $NH_2(X^2B_1)$ Radical," [Erratum to: J. Phys. Chem. 75, 2087 (1975)] J. Phys. Chem. 79, 3080 (1975)

75 GRA Graham, R. A., "The Photochemistry of $NØ_3$ and the Kinetics of the $N_2Ø_5$-$Ø_3$ System," Lawrence Berkeley Lab. Univ. of Calif., Berkeley, Report LBL-4147, 1975

75 GRY/ROZ Gryaznov, V. A., and Rozlovskii, A. I., "Kinetics of the Addition of Nitrogen Dioxide to Multiple-Bonded Hydrocarbons," Dokl. Phys. Chem. 220, 113 (1975); tr. of: Dokl. Akad. Nauk SSSR 220, 1099 (1975)

75 HAC/HØY Hack, W., Hoyermann, K., and Wagner, H. G., "The Reaction of $NØ + HØ_2 \rightarrow NØ_2 + ØH$ with $ØH + H_2O_2 \rightarrow HO_2 + H_2O$ as an $HO_2$-Source," Int. J. Chem. Kinet. 7, (Symp. 1.), 329 (1975)

75 HAM Hamilton, E. J. Jr., "Water Vapor Dependence of the Kinetics of the Self-Reaction of $HØ_2$ in the Gas Phase," J. Chem. Phys. 63, 3682 (1975)

75 HAN/LAN Hancock, G., Lange, W., Lenzi, M., and Welge, K. H., "Laser Fluorescence of $NH_2$ and Rate Constant Measurement of $NH_2$ +

NO," Chem. Phys. Lett. 33, 168 (1975)

75 HAR/BUR Harker, A. B., and Burton, C. S., "A Study of the Mechanism and Kinetics of the Reaction of $O(^3P)$ Atoms with Propane," Int. J. Chem. Kinet. 7, 907 (1975)

75 HAR/WAY Harris, G. W., and Wayne, R. P., "Reaction of Hydroxyl Radicals with NO, $NO_2$ and $SO_2$," J. Chem. Soc., Faraday Trans. I 71, 610 (1975)

75 HAY/IVE Haynes, B. S., Iverach, D., and Kirov, N. Y., "The Behavior of Nitrogen Species in Fuel Rich Hydrocarbon Flames," Symp. Combust. 15 (Combustion Institute Pittsburgh, Pa., 1975) 1103

75 HER/HUI Herron, J. T., and Huie, R. E., "Application of Beam Sampling Mass Spectrometry to the Kinetics of Ozone Reactions,"Int. J. Mass Spect. and Ion Phys. 16, 125 (1975)

75 HER/WAG1 Herbrechtsmeier, P., and Wagner, H. Gg., "Reaktion von $O(^3P)$-Atomen mit Aethylacetylen," Ber. Bunsenges. Phys. Chem. 79, 461 (1975)

75 HER/WAG2 Herbrechtsmeier, P., und Wagner, H. Gg., "Reaktion von $O(^3P)$-Atomen mit Dimethylacetylen," Ber. Bunsenges. Phys. Chem. 79, 673 (1975)

75 HIP/SCH Hippler, H., Schippert, C., and Troe, J., "Photolysis of $NO_2$ and Collisional Energy Transfer in the Reactions O + NO → $NO_2$ and O + $NO_2$ → $NO_3$," Int. J. Chem. Kinet. 7 (Symp. 1), 27 (1975)

75 HOM/SCH Homann, K. H., Schwanebeck, W., und Warnatz, J., "Reaktionen des Butadiins II. Die Reaktion mit Sauerstoffatomen," Ber. Bunsenges. Phys. Chem. 79, 536 (1975)

75 HOO/SIM Hooper, D. G., Simon, M., and Back, M. H., "The Temperature Dependence of the Ratio $k_d/k_c$ for Ethyl Radicals," Can. J. Chem. 53, 1237 (1975)

75 HUC/BOO Hucknall, D. J., Booth, D., and Sampson, R. J., "Reactions of Hydroxyl Radicals with Alkanes," Int. J. Chem. Kinet. 7,(Symp. 1.), 301 (1975)

75 HUG/MAR Hughes, D. G., and Marshall, R. M., "Recombination of Ethyl Radicals in the Range 693-803 K," J. Chem. Soc., Faraday Trans. I 71, 413 (1975)

75 HUI/HER Huie, R. E., and Herron, J. T., "Temperature Dependence of the Rate Constants for Reactions of Ozone with Some Olefins," Int. J. Chem. Kinet. 7, (Symp. 1.), 165 (1975)

75 HUS/YOU Husain, D., and Young, A. N., "Kinetic Investigation of Ground State Carbon Atoms, $C(2\,^3P_J)$," J. Chem. Soc., Faraday Trans. II 71, 525 (1975)

75 JAP/NIK Japar, S. M., and Niki, H., "Gas-Phase Reactions of the Nitrate Radical with Olefins," J. Phys. Chem. 79, 1629 (1975)

75 KIN/GOD1 King, K. D., and Goddard, R. D., "Very Low-Pressure Pyrolysis(VLPP) of Alkyl Cyanides. I. The Thermal Unimolecular Reactions of Isopropyl Cyanide," J. Am. Chem. Soc. 97, 4504 (1975)

75 KIN/GOD2 King, K. D., and Goddard, R. D., "Very Low-Pressure Pyrolysis (VLPP) of Alkyl Cyanides. II. n-Propyl Cyanide and Isobutyl Cyanide. The Heat of Formation and Stabilization Energy of the Cyanomethyl Radical," Int. J. Chem. Kinet. 7, 837 (1975)

75 KLE/PAY Klemm, R. B., Payne, W. A., and Stief, L. J., "Absolute Rate Parameters for the Reaction of Atomic Hydrogen with $H_2O_2$," Int. J. Chem. Kinet. 7 (Symp. 1), 61 (1975)

75 KNØ/SCH Knoll, Von H., Scherzer, K., and Wilhelm, H-D., "Ueber den Thermischen Zerfall von Acetonylaceton. III. Mitteilung," Z. Phys. Chemie, Leipzig 256, 673 (1975)

75 KØS/AND Koshi, M., Ando, H., Øya, M., and Asaba, T., "Shock Tube Study of Decomposition of Nitric Øxide at High Temperatures," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 809

75 KUR/BRA Kurylo, M. J., Braun, W., Xuan, C. N., and Kaldor, A., "Infrared Laser Enhanced Reactions: Temperature Resolution of the Chemical Dynamics of the $Ø_3$ + NØ Reaction System," J. Chem. Phys. 62, 2065 (1975)

75 LAU/BAS1 Laufer, A. H., and Bass, A. M., "Mechanism and Rate Constant of the Reaction between Methylene and Methyl Radicals," J. Phys. Chem. 79, 1635 (1975)

75 LAU/BAS2 Laufer, A. H., and Bass, A. M., "Rate Constants of the Combination of Methyl Radicals with Nitric Oxide and Øxygen," Int J. Chem. Kinet. 7, 639 (1975)

75 LES/KHE Lesclaux, R., Khe, P. V., Dezauzier, P., and Soulignac, J. C., "Flash Photolysis Studies of the Reaction of $NH_2$ Radicals with NO," Chem. Phys. Lett. 35, 493 (1975)

75 LIF/FRE1 Lifshitz, A., and Frenklach, M., "Mechanism of the High Temperature Decomposition of Propane," J. Phys. Chem. 79, 686 (1975)

75 LIF/FRE2 Lifshitz, A., Frenklach, M., and Burcat, A., "The Structural Isomerization $CH_2{=}C{=}CH_2 \rightleftharpoons CH_3{-}C{\equiv}CH$. Studies with a Single Pulse Shock Tube," J. Phys. Chem. 79, 1148 (1975)

75 LIS/MAS Lissi, E. A., Massiff, G., and Villa, A., "Addition of Methoxy Radicals to Øleffins," Int. J. Chem. Kinet. 7, 625 (1975)

75 MAR/KAU Margitan, J. J., Kaufman, F., and Anderson, J. G., "Kinetics of the Reaction ØH + $HNØ_3$ -> $H_2Ø$ + $NØ_3$," Int. J. Chem. Kinet. 7 (Symp. 1), 281 (1975)

75 MEA/HEI Meagher, J. F., and Heicklen, J., "The Photolysis of Hydrogen Peroxide in the Presence of Carbon Monoxide," J. Photochem. 3, 455 (1975)

75 MEN/GOL Mendenhall, G. D., Golden, D. M., and Benson, S. W., "The Very-Low-Pressure Pyrolysis (VLPP) of n-Propyl Nitrate, tert-Butyl Nitrite, and Methyl Nitrite. Rate Constants for Some Alkoxy Radical Reactions," Int. J. Chem. Kinet. 7, 725 (1975)

75 MIH/SCH Mihelcic, D., Schubert, V., Hoefler, F., and Fotzinger, P., "Bestimmung kinetischer Isotopieeffekte der Additionsreaktion des Wasserstoffatoms an Aethylen und Propen mit Hilfe der Pulsradiolyse," Ber. Bunsenges. Phys. Chem. 79, 1230 (1975)

75 MUL/PHI Mulvihill, J. N., and Phillips, L. F., "Breakdown of Cyanogen in Fuel-Rich $H_2/N_2/O_2$ Flames," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 1113

75 NAM/SHE Nametkin, N. S., Shevel'kova, L. V., and Kalinenko, R. A., "Rate Constants of the Reactions of Hydrogen Atoms with Ethylene and Butadiene at High Temperatures," Dokl Chem. 221, 239 (1975); tr. of: Dokl. Akad. Nauk SSSR 221, 851 (1975)

75 OSI/SIM Osif, T. L., Simonaitis, R., and Heicklen, J., "The Reactions of $O(^1D)$ and HO with $CH_3OH$," J. Photochem. 4, 233 (1975)

75 OVE/PAR Overend, R. P., Paraskevopoulos, G., and Cvetanovic, R. J., "Rates of OH Radical Reactions. I. Reactions with $H_2$, $CH_4$, $C_2H_6$, and $C_3H_8$ at 295K," Can. J. Chem. 53, 3374 (1975)

75 PAC Pacey, P. D., "The Initial Stages of the Pyrolysis of Dimethyl Ether," Can. J. Chem. 53, 2742 (1975)

75 PAR Parkes, D. A., "The Roles of Alkylperoxy and Alkoxy Radicals in Alkyl Radical Oxidation at Room Temperature," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 795

75 PAR/QUI Parkes, D. A., and Quinn, C. P., "The Ultraviolet Absorption Spectrum of Tert-Butyl Radicals and the Rate Constant for their Recombination," Chem. Phys. Lett. 33, 483 (1975)

75 PAS/CAR Pastrana, A. V., and Carr, R. W. Jr., "Kinetics of the Reaction of Hydroxyl Radicals with Ethylene, Propylene, 1-Butene, and trans-2-Butene," J. Phys. Chem. 79, 765 (1975)

75 PEE/VIN Peeters, J., and Vinckier, C., "Production of Chemi-Ions and Formation of CH and $CH_2$ Radicals in Methane-Oxygen and Ethylene-Oxygen Flames," Symp. Combust. 15 (Combustion Institute Pittsburgh, Pa., 1975) 185

75 PIL/ROB Pilling, M. J., and Robertson, J. A., "A Rate Constant for $CH_2(^3B_1) + CH_3$," Chem. Phys. Lett. 33, 336 (1975)

75 ROT/JUS Roth, P., and Just, Th., "Atom-Resonanzabsorptionsmessungen beim thermischen Zerfall von Methan hinter Stosswellen," Ber. Bunsenges. Phys. Chem. 79, 682 (1975)

75 SAK/NOH Sakai, T., and Nohara, D., "Kinetics and Mechanism on a Reaction of Allyl Radical with Ethylene," Bull. Jpn. Pet. Inst. 17, 212 (1975)

75 SCH/PLA Scherzer, K., and Plarre, D., "Der Thermische Zerfall von Diacetyl. II. Mitteilung: Untersuchungen bei hohen Temperaturen," Z. Phys. Chemie, (Leipzig) 256, 660 (1975)

75 SCH/WAR Schwanebeck, W., und Warnatz, J., "Reaktionen des Butadiins I. Die Reaktion mit Wasserstoffatomen," Ber. Bunsenges. Phys. Chem. 79, 530 (1975)

75 SEL/WAD Selby, K., and Waddington, D. J., "Reactions of Oxygenated Radicals in the Gas Phase. Part II. Reactions of Peracetyl Radicals and Butenes," J. Chem. Soc., Perkin Trans. II 15, 1715 (1975)

75 SHA/DEN Shafikov, N. Ya., Denisova, L. N., and Denisov, E. T., "Free-Radical Formation in the RH + $O_2$ System V. n-Heptane, Toluene, and Cyclohexene," Kinet. and Catal. 16, 754 (1975); tr. of: Kinet. i Katal. 16, 872 (1975)

75 SIM/HEI Simonaitis, R., and Heicklen, J., "Reactions of $CH_3$, $CH_3O$, and $CH_3O_2$ Radicals with $O_3$," J. Phys. Chem. 79, 298 (1975)

75 SIN/FUR Singleton, D. L., Furuyama, S., Cvetanovic, R. J., and Irwin, R. S., "Temperature Dependence of the Rate Constants for the Reactions $O(^3P)$ + 2,3-Dimethyl-2-Butene and $O(^3P)$ + NO + M Determined by a Phase Shift Technique," J. Chem. Phys. 63, 1003 (1975)

75 SLA/GRA1 Slagle, I. R., Graham, R. E., Gilbert, J. R., and Gutman, D., "Direct Determination of the Rate Constant for the Reaction of Oxygen Atoms with Carbon Monosulphide," Chem. Phys. Lett. 32, 184 (1975)

75 SLA/GRA2 Slagle, I. R., Graham, R. E., and Gutman, D., "Reactions of Oxygen Atoms with Methanethiol, Ethanethiol and Methyl Sulfide," Am. Chem. Soc., 107th National Meeting (Abst. of Papers) 170, PHYS-96 (1975)

75 SLE/WAR1 Slemr, F., and Warneck, P., "Reactions of Atomic Hydrogen with Ketene and Acetaldehyde," Ber. Bunsenges Phys. Chem. 79, 152 (1975)

75 SLE/WAR2 Slemr, F., und Warneck, P., "Untersuchung von Atom-Reaktionen mit einem Photoionisations-Massenspektrometer," Ber. Bunsen Gesellschaft fuer Phys. Chem. 79, 1163 (1975)

75 SMI/ZEL Smith, I. W. M., and Zellner, R., "Rate Measurements of OH by Resonance Absorption. IV. Reactions of OH with $NH_3$ and $HNO_3$," Int. J. Chem. Kinet. 7 (Symp. 1), 341 (1975)

75 STE/RAB Stein, S. E., and Rabinovitch, B. S., "Disproportionation-Combination Ratios in Thermalized Cyclic Radical Systems. Rate of Isomerization of Pent-2-en-5-yl Radical," Int. J. Chem. Kinet. 7, 531 (1975)

75 STE/ZEL Steinert, W., and Zellner, R., "Rates of Reaction of OH with CO and $CH_4$ over an Extended Temperature Range," Deuxieme Symp. European sur la Combust. (Orleans, Sept. 1-5) 2, 31 (1975)

75 STI/PAY Stief, L. J., Payne, W. A., and Klemm, R. B., "A Flash Photolysis-

Resonance Fluorescence Study of the Formation of $O(^1D)$ in the Photolysis of Water and the Reaction of $O(^1D)$ with $H_2$, Ar, and He," J. Chem. Phys. 62, 4000 (1975)

75 SZI/MAR Szirovicza, L., and Márta, F., "Kinetics of the Decomposition of NEO-Pentane Sensitized by Azoisopropane," React. Kinet. and Catal. Lett. 3, 9 (1975)

75 TAN/KRA Taniewski, M., and Krajewski, J., "Thermal Decomposition of n-Heptane," Przemysl Chemiczny 54, 31 (1975)

75 TAR Tardy, D. C., "Transition State Energy Stabilization in the Reactions Allyl + Propene and Methyl + 1,3-Butadiene," J. Am. Chem. Soc. 97, 5695 (1975)

75 TAY Taylor, R., "The Nature of the Transition State in Ester Pyrolysis. Part II. The Relative Rates of Pyrolysis of Ethyl, Isopropyl, and t-Butyl Acetates, Phenylacetates, Benzoates, Phenyl Carbonates, and N-Phenylcarbamates," J. Chem. Soc. Perkin Trans. II 10, 1025 (1975)

75 TOB/TOB Toby, F. S., and Toby, S., "The Reaction of Ozone with 1,3-Butadiene and with Allene," Int. J. Chem. Kinet. 7 (Symp. 1), 197 (1975)

75 TRA/ROS Trainor, D. W., and Rosenberg, C. W. von Jr., "Energy Partitioning in the Products of Elementary Reactions Involving OH-Radicals," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 755

75 TRE Trenwith, A. B., "Thermal Decomposition of Isopropanol," J. Chem. Soc., Faraday Trans. I 71, 2405 (1975)

75 TRU/MAC Trung, Q. L., Mackay, D., Hirata, A., and Trass, O., "A Shock Tube Study of the Thermal Decomposition of Nitric Oxide," Combust. Sci. and Tech. 10, 155 (1975)

75 TSU/YOK Tsunashima, Yokota, T., Safarik, I., Gunning, H. E., Strausz, O. P., "Abstraction of Sulfur Atoms from Carbonyl Sulfide by Atomic Hydrogen," J. Phys. Chem. 79, 775 (1975)

75 VAN/PEE Vandooren, J., Peeters, J., and Van Tiggelen, P. J., "Rate Constant of the Elementary Reaction of Carbon Monoxide with Hydroxyl Radical," Symp. Combust. 15, (Combustion Institution Pittsburgh, Pa., 1975) 745

75 VAR/SAC Vardanyan, I. A., Sachyan, G. A., and Nalbandyan, A. B., "The Rate Constant of the Reaction $HO_2 + CO \rightarrow CO_2 + OH$," Int. J. Chem. Kinet. 7, 23 (1975)

75 VAS/MAK Vasil'ev, G. K., Makarov, E. F., and Chernyshev, Yu. A., "Measurement of the Chain Propagation and Termination Rate Constants for the Reaction $F_2 + H_2(D_2)$ Inhibited by $O_2$," Kinet. and Catal. 16, 272 (1975); tr. of: Kinet. i Katal. 16, 320 (1975)

75 WAL/KAU Walkauskas, L. P., and Kaufman, F., "Gas Phase Hydrogen Atom Recombination," Symp. Combust. 15, (Combustion Institute Pittsburgh, Pa., 1975) 691

75 WAS/KLE Washida, N., Kley, D., Becker, K. H., and Groth, W., "Experimental Study of the $C(^3P) + N(^4S) + M \rightarrow CN(B^2\Sigma^+) + M$ Recombination," J. Chem. Phys. 63, 4230 (1975)

75 WEA/MEA Weaver, J., Meagher, J., Shortridge, R., and Heicklen, J., "The Oxidation of Acetyl Radicals," J. Photochem. 4, 341 (1975)

75 WEI/TIM Wei, C-N., and Timmons, R. B., "ESR Study of the Kinetics of the Reactions of $O(^3P)$ Atoms with $CS_2$ and OCS," J. Chem. Phys. 62, 3240 (1975)

75 WES/DEH1 Westenberg, A. A., and DeHaas, N., "Rate of the $O + SO_3$ Reaction," J. Chem. Phys. 62, 725 (1975)

75 WES/DEH2 Westenberg, A. A., and DeHaas, N., "Rate of the Reaction $O + SO_2 + M \rightarrow SO_3 + M$," J. Chem. Phys. 63, 5411 (1975)

75 YAM Yampol'skii, Yu. P., "Reactivity of Primary and Secondary Carbon-Hydrogen Bonds in Radical Processes," React. Kinet. Catal. Lett. 2, 449 (1975)

75 YO Yo, B-T., "The Reaction of Active Nitrogen with Hydrazine," Diss. Abst. Int. B 35, 4862 (1975)

75 YOK/AHM Yokota, T., Ahmed, M. G., Safarik, I., Strausz, O. P., and Gunning, H. E., "Reaction of Hydrogen Atoms with Thiirane," J. Phys. Chem. 79, 1758 (1975)

75 ZAB/CAR Zabransky, V., and Carr, R. W. Jr., "Photodissociation of Ketene at 313 nm," J. Phys. Chem. 79, 1618 (1975)

75 ZET/STU Zetzsch, C., and Stuhl, F., "Detection and Quenching of $NH(b^1\Sigma^+)$ in the Pulsed Vacuum UV Photolysis of $NH_3$," Chem. Phys. Lett. 33, 375 (1975)

1976

76 ANA/SMI Anastasi, C., and Smith, I. W. M., "Rate Measurements of Reactions of OH by Resonance Absorption. Part 5. Rate Constants for $OH + NO_2(+M) \rightarrow HNO_3(+M)$ over a wide range of temperature and pressure," J. Chem. Soc., Faraday Trans. II 72, 1459 (1976)

76 AND/ASA Ando, H., and Asaba, T., "Rate Constants of Elementary Reactions in the High Temperature System of Nitric Oxide and Hydrogen," Int. J. Chem. Kinet. 8, 259 (1976)

76 ART/LEE Arthur, N. L., and Lee, M-S., "Reactions of Methyl Radicals. I. Hydrogen Abstraction from Dimethyl Sulphide," Aust. J. of Chem. 29, 1483 (1976)

76 ATK/PER1 Atkinson, R. Perry, R. A., and Pitts, J. N. Jr., "Rate Constants for the Reaction of OH Radicals with 2-Methyl-2-Butene over the Temperature Range 297-425 K," Chem. Phys. Lett. 38, 607 (1976)

76 ATK/PER2 Atkinson, R., Perry, R. A., and Pitts, J. N. Jr., "Kinetics of the Reactions of OH Radicals with CO and $N_2O$," Chem. Phys. Lett. 44, 204 (1976)

76 ATK/PER3 Atkinson, R., Perry, R. A., and Pitts, J. N. Jr., "Rate Constants for the Reactions of the OH Radical with $NO_2$(M=Ar and $N_2$) and $SO_2$(M=Ar)," J. Chem. Phys. 65, 306 (1976)

76 BAK/BAL Baker, R. R., Baldwin, R. R., and Walker, R. W., "Addition of Neopentane to Slowly Reacting Mixtures of $H_2$ + $O_2$ at 480°C. Part II. The Addition of the Primary Products from Neopentane, and the Rate Constants for H and OH Attack on Neopentane," Combust. and Flame 27, 147 (1976)

76 BAL/CLE Baldwin, R. R., Cleugh, C. J., and Walker, R. W., "Reactions of iso-Propyl Radicals with Oxygen, Hydrogen and Deuterium" J. Chem. Soc., Faraday Trans. I 72, 1715 (1976)

76 BAR/BER Bardi, I., Berces, T., and Szilagyi, I., "Reactions of Methyl Radicals with Acetaldehyde and Acetaldehyde-$d_1$. I. Relative Rates of Atom Abstraction Reactions at 785°K," Int. J. Chem. Kinetics 8, 285 (1976)

76 BAT/MCC1 Batt, L., and McCulloch, R. D., "Pyrolysis of Dimethyl Peroxide," Int. J. Chem. Kinet. 8, 491 (1976)

76 BAT/MCC2 Batt, L., and McCulloch, R. D., "The Gas-Phase Pyrolysis of Alkyl Nitrites. II. s-Butyl Nitrite," Int. J. Chem. Kinet. 8, 511 (1976)

76 BAT/MIL Batt, L., and Milne, R. T., "The Gas Phase Pyrolysis of Alkyl Nitrites. I. t-Butyl Nitrite," Int. J. Chem. Kinet. 8, 59 (1976)

76 BID/BRE Bida, G. T., Breckenridge, W. H., and Kolin, W. S., "A Kinetic Study of the very Fast Reaction: $O(^3P)$ + CS → CO + $S(^3P)$," J. Chem. Phys. 64, 3296 (1976)

76 BIE/ZET Biermann, H. W., Zetzsch, C., and Stuhl, F., "Rate Constant for the Reaction of OH with $N_2O$ at 298 K," Ber. Bunsenges. Phys. Chem. 80, 909 (1976)

76 BIG/WEA1 Bigley, D. B., and Weatherhead, R. H., "Studies in Decarboxylation. Part VIII. The Gas-phase Pyrolysis of βγ-Acetylenic Acids," J. Chem. Soc. Perkin Trans. II, 592 (1976)

76 BIG/WEA2 Bigley, D. B., and Weatherhead, R. H., "Studies in Decarboxylation. Part IX. The Gas-phase Pyrolysis of some Acids containing Two Double Bonds," J. Chem. Soc. Perkin Trans. II, 704 (1976)

76 BIR/SHO Birks, J. W., Shoemaker, B., Leck, T. J., and Hinton, D. M., "Studies of Reactions of Importance in the Stratosphere. I. Reaction of Nitric Oxide with Ozone," J. Chem. Phys. 65, 5181 (1976)

76 BLA/VAY Blake, P. G., and Vayjooee, M. B., "Reactions of Keten. Part V. Gas-phase Reactions with Carboxylic Acids. Effect of Alkyl Substituents," J. Chem. Soc., Perkin Trans. II, 988 (1976)

76 BRA/CAF Bradley, J. N., Capey, W. D., Fair, R. W., and Pritchard, D. K., "A Shock-Tube Study of the Kinetics of Reaction of Hydroxyl Radicals with $H_2$, CO, $CH_4$, $CF_3H$, $C_2H_4$ and $C_2H_6$," Int. J. Chem. Kinet. 8, 549 (1976)

76 BRA/HEI Braslavsky, S., and Heicklen, J., "The Gas-Phase Reaction of $O_3$ with $H_2CO$," Int. J. Chem. Kinet. 8, 801 (1976)

76 BRA/WES1 Bradley, J. N., and West, K. O., "Single-pulse Shock Tube Studies of Hydrocarbon Pyrolysis. Part 5. Pyrolysis of Neopentane," J. Chem. Soc., Faraday Trans. I 72, 8 (1976)

76 BRA/WES2 Bradley, J. N., and West, K. O., "Single-pulse Shock Tube Studies of Hydrocarbon Pyrolysis. Part 6. The Pyrolysis of Isobutene," J. Chem. Soc., Faraday Trans. I 72, 558 (1976)

76 BRY/LEV Bryukhovsteskii, V. A., Levush, S. S., and Shevchuk, V. U., "Preparation of Peracetic Acid by Gas-phase Oxidation of Acetaldehyde, Initiated by Ozone," J. Appl. Chem. USSR 49, 476 (1976); tr. of Zh. Prikl. Khim. 49, 473 (1976)

76 CAL/MET Calear, A. B., and Metcalfe, M. P., "Oscillator Strengths of the Band of the $B^2A_1'$-$X^2A_2''$ System of $CD_3$ and a Spectroscopic Measurement of the Recombination Rate. Comparison with $CH_3$," Chem. Phys. 14, 275 (1976)

76 CAM/MCL Campbell, I. M., McLaughlin, D. F., and Handy, B. J., "Rate Constants for Reactions of Hydroxyl Radicals with Alcohol Vapours at 292 K," Chem. Phys. Lett. 38, 362 (1976)

76 CHA/NOR Chan, W. H., Nordstrom, R. J., Calvert, J. G., and Shaw, J. H., "Kinetic Study of HONO Formation and Decay Reactions in Gaseous Mixtures of HONO, NO, $NO_2$, $H_2O$, and $N_2$," Envir. Sci. and Tech. 10, 674 (1976)

76 CHE/BAC Chen, C-J., Back, M. H., and Back, R. A., "The Thermal Decomposition of Methane. II. Secondary Reactions, Autocatalysis and Carbon Formation; non-Arrhenius Behaviour in the Reaction of $CH_3$ with Ethane," Can. J. Chem. 54, 3175 (1976)

76 CHO/BEA Choo, K. Y., Beadle, P. C., Piszkiewicz, L. W., and Golden, D. M., "An Absolute Measurement of the Rate Constant for t-Butyl Radical Combination," Int. J. Chem. Kinet. 8, 45 (1976)

76 CLA/QUI Clark, J. A., and Quinn, C. P., "Kinetic Isotope Effect in the Thermal Dissociation of Ethane," J. Chem. Soc., Faraday Trans. I 72, 706 (1976)

76 COX/DER1 Cox, R. A., Derwent, R. G., and Holt, P. M., "Relative Rate Constants for the Reactions of OH Radicals with $H_2$, $CH_4$, CO, NO and HONO at Atmospheric Pressure and 296 K," J. Chem. Soc., Faraday Trans. I 72, 2031 (1976)

76 COX/DER2 Cox, R. A., Derwent, R. G., Holt, P. M., and Kerr, J. A., "Photo-Oxidation of Methane in the Presence of NO and $NO_2$," J. Chem. Soc., Faraday Trans. I 72, 2044 (1976)

76 COX/DER3 Cox, R. A., Derwent, R. G., Holt, P. M., and Kerr, J. A.,

"Photolysis of Nitrous Acid in the Presence of a Acetaldehyde," J. Chem. Soc., Faraday Trans. I 72, 2061 (1976)

76 CRO/HUN Cross, J. T. D., Hunter, R., and Stimson, R., "The Thermal Decomposition of Simple Carbonate Esters," Aust. J. of Chem. 29, 1477 (1976)

76 DAR/WIN Darnall, K. R., Winer, A. M., Lloyd, A. C., and Pitts, J. N. Jr., "Relative Rate Constants for the Reaction of OH Radicals with Selected $C_6$ and $C_7$ Alkanes and Alkenes at 305 ± 2K," Chem. Phys. Lett. 44, 415 (1976)

76 DAV Davenport, J. E., "The Ultraviolet Photolysis of Ozone," Diss. Abst. Int. B 36, 5056 (1976)

76 DAV/SAD Davidson, J. A., Sadowski, C. M., Schiff, H. I., Streit, G. E., Howard, C. J., Jennings, D. A., and Schmeltekopf, A. L., "Absolute Rate Constant Determinations for the Deactivation of $O(^1D)$ by time Resolved Decay of $O(^1D) \rightarrow O(^3P)$ emission," J. Chem. Phys. 64, 57 (1976)

76 DEA Dean, A. M., "Shock Tube Studies of the $N_2O/Ar$ and $N_2O/H_2/Ar$ Systems," Int. J. Chem. Kinet. 8, 459 (1976)

76 DEB/TAY DeBurgh Norfolk, S., and Taylor, R., "The Mechanism of the Gas-phase Pyrolysis of Esters. Part IV. Effects of Substituents at the β-Carbon Atom," J. Chem. Soc. Perkin Trans. II, 280 (1976)

76 DUM Dumas, J. L., "Étude de la Réactivité Chimique de l'oxygène singulet produit en Phase Gazeuse. I. Études en Phase Homogène," Bull. Soc. Chim. France, 658 (1976)

76 ERN/SPI Ernst, J., Spindler, K., and Wagner, H. Gg., "Untersuchungen zum Thermischen Zerfall von Acetaldehyd und Aceton," Ber. Bunsenges. Phys. Chem. 80, 645 (1976)

76 FIF Fifer, R. A., "Kinetics of the Reaction $OH + HNO_2 \rightarrow H_2O + NO_2$ at High Temperatures Behind Shock Waves," J. Phys. Chem. 80, 2717 (1976)

76 FLE/HUS Fletcher, I. S., and Husain, D., "The Collisional Quenching of Electronically excited Oxygen Atoms, $O(2^1D_2)$, by the Gases $NH_3$, $H_2O_2$, $C_2H_6$, $C_3H_8$, and $C(CH_3)_4$, using Time-resolved Attenuation of Atomic Resonance Radiation," Can. J. Chem. 54, 1765 (1976)

76 FLO Flower, W. L., "Experimental Study of Nitric Oxide-Hydrogen Reaction Kinetics," Diss. Abst. Int. B 37, 924 (1976)

76 FRE/STE Freund, S. M., and Stephenson, J. C., "Laser Enhanced Chemical Reaction Between $O_3$ (001) and $NO^+$," Chem. Phys. Lett. 41, 157 (1976)

76 GLA/QUA Glaenzer, K., Quack, M., and Troe, J., "A Spectroscopic Determination of the Methyl Radical Recombination Rate Constant in Shock Waves," Chem. Phys. Lett. 39, 304 (1976)

76 GOL/CHO Golden, D. M., Choo, K. Y., Perona, M. J., and Piszkiewicz, L. W., "An Absolute Measurement of the Rate Constant for Ethyl Radical Combination," Int. J. Chem. Kinet. 8,

381 (1976)

76 GØR/LIN Gordon, R. J., and Lin, M. C., "The Reaction of Nitric Oxide with Vibrationally excited Ozone, II," J. Chem. Phys. 64, 1058 (1976)

76 GRA Graham, R. A., "The Photochemistry of $NO_3$ and the Kinetics of the $N_2O_5$-$O_3$ System," Diss. Abst. Int. B 37, 249 (1976)

76 GRY/RØZ Gryaznov, V. A., and Rozlovskii, A. I., "Kinetics of the Reaction of Monoolefins with Nitrogen Dioxide," Dokl. Phys. Chem. 230, 947 (1976); tr. of: Dokl. Adad. Nauk SSSR 230, 1129 (1976)

76 HAC/WAG Hack, W., and Wagner, H. Gg., "Reaktionen von Wasserstoff-Atomen mit Hydroperoxyl-Radikalen. Teil 1," Max-Plank-Institut fuer Stroemungsforschung, Bericht MPIS-22, (1976)

76 HAN/HOE Hansen, I., Hoeinghaus, K., Zetzsch, C., and Stuhl, F., "Detection of NH($X^3\Sigma$-) by Resonance Fluorescence in the Pulsed Vacuum UV Photolysis of $NH_3$ and its Application to Reactions of NH Radicals," Chem. Phys. Lett. 42, 370 (1976)

76 HAR/NAS Harris, R. J., Nasralla, M., and Williams, A., "The Formation of Oxides of Nitrogen in High Temperature $CH_4$-$O_2$-$N_2$ Flames," Combust. Sci. and Tech. 14, 85 (1976)

76 HAS/FRE Hastie, D. R., Freeman, C. G., McEwan, M. J., and Schiff, H. I., "The Reactions of Ozone with Methyl and Ethyl Nitrites," Int. J. Chem. Kinet. 8, 307 (1976)

76 HAV/HUN Havel, J. J., and Hunt, C. J., "Atomic Oxygen. VI. Isotope Effects in the Reactions of Deuterated 2-Methylpropenes with Oxygen ($^3P$) Atoms," J. Phys. Chem. 80, 779 (1976)

76 HER/MAR Herman, I. P., Mariella, R. P. Jr., and Javan, A., "The Laser-Stimulated Reaction: $NO_2 + CO \rightarrow NO + CO_2$," J. Chem. Phys. 65, 3792 (1976)

76 HIG/SAI Higashihara, T., Saito, Ko., and Yamamura, H., "$S_2$ Formation during the Pyrolysis of $H_2S$ in Shock Waves," Bull. Chem. Soc. Japan 49, 965 (1976)

76 HØG/BUR Hogan, L. G., and Burch, D. S., "A Measurement of the Rate Constant for the Reaction $O + O_2 + O_2 \rightarrow O_3 + O_2$," J. Chem. Phys. 65, 894 (1976)

76 HØW Howard, C. J., "Rate Constants for the Gas-Phase Reactions of OH Radicals with Ethylene and Halogenated Ethylene Compounds," J. Chem. Phys. 65, 4771 (1976)

76 HOW/EVE1 Howard, C. J., and Evenson, K. M., "Rate Constants for the Reactions of OH with $CH_4$ and Fluorine, Chlorine, and Bromine Substituted Methanes at 296K," J. Chem. Phys. 64, 197 (1976)

76 HØW/EVE2 Howard, C. J., and Evenson, K. M., "Rate Constants for the Reactions of OH with Ethane and some Halogen Substituted Ethanes at 269K," J. Chem. Phys. 64, 4303 (1976)

76 IBU/TSU Ibuki, T., Tsuji, A., and Takezaki, Y., "Isomerization of

Chemically Activated 1-Buten-1-yl and 1-Buten-4-yl Radicals," J. Phys. Chem. 80, 8 (1976)

76 JAP/WU Japar, S. M., Wu, C. H., and Niki, H., "Effect of Molecular Oxygen on the Gas Phase Kinetics of the Ozonolysis of Olefins," J. Phys. Chem. 80, 2057 (1976)

76 JAY/SIM Jayanty, R. K. M., Simonaitis, R., and Heicklen, J., "$H_2$ Formation in the Reaction of $O(^1D)$ with $CH_4$," Int. J. Chem. Kinet. 8, 107 (1976)

76 KEI/LYN Keil, D. G., Lynch, K. P., Cowfer, J. A., and Michael, J. V., "An Investigation of Nonequilibrium Kinetic Isotope Effects in Chemically Activated Vinyl Radicals," Int. J. Chem. Kinet. 8, 825 (1976)

76 KIN/GOD King, K. D., and Goddard, R. D., "Very Low-Pressure Pyrolysis of Alkyl Cyanides. III. tert-Butyl Cyanide. Effect of the Cyano Group on Bond Dissociation Energies and Reactivity," J. Phys. Chem. 80, 546 (1976)

76 KOI/MOR Koike, T., and Morinaga, K., "Shock Tube Studies of the Rate Constant for Chemical Excitation of Hydroxyl Radicals," Bull. Chem. Soc. Japan 49, 1457 (1976)

76 KRI Krieger, B. B., "Oxygen Atom and Hydrocarbon Chemiluminescence: The Mechanism and Rate Constants for the Production and Loss of OH(v=9) in the Reaction of Oxygen Atoms and Ethylene," Diss. Abst. Int. B 37, 2398 (1976)

76 LEE Lee, J. H., "Gas Phase Kinetic Study of some Simple Atom-Molecule Reactions using fast flow and Flash Photolysis-Resonance Fluorescence Techniques," Diss. Abstracts Int. 36, 6192 (1976)

76 LEE/TIM Lee, J. H., Timmons, R. B., and Stief, L. J., "Absolute Rate Parameters for the Reaction of Ground State Atomic Oxygen with Dimethyl Sulfide and Episulfide," J. Chem. Phys. 64, 300 (1976)

76 LES/SOU Lesclaux, R., Soulignac, J. C., and Khe, P. V., "The Kinetics of the Reaction between $NH_2$ and Propylene studied by Laser Resonance Absorption," Chem. Phys. Lett. 43, 520 (1976)

76 LLO/DAR1 Lloyd, A. C., Darnall, K. R., Winer, A. M., and Pitts, J. N. Jr., "Relative Rate Constants for the Reactions of OH Radicals with Isopropyl Alcohol, Diethyl and Di-n-Propyl Ether at 305 ± 2 K," Chem. Phys. Lett. 42, 205 (1976)

76 LLO/DAR2 Lloyd, A. C., Darnall, K. R., Winer, A. M., and Pitts, J. N. Jr., "Relative Rate Constants for Reaction of the Hydroxyl Radical with a Series of Alkanes, Alkenes, and Aromatic Hydrocarbons," J. Phys. Chem. 80, 789 (1976)

76 LYN/SCH Lynch, K. P., Schwab, T. C., and Michael, J. V., "Lyman-α Absorption Photometry at High Pressure and Atom Density Kinetic Results for H Recombination," Int. J. Chem. Kinet. 8, 651 (1976)

76 MAR/PUR Marshall, R. M., Purnell, H. and Storey, P. D., "Chain

Initiation of Neopentane Pyrolysis and a Suggested Reconciliation of the Thermochemically Calculated and Measured Rate Constants for the Recombination of t-Butyl Radicals," J. Chem. Soc., Faraday Trans. I 72, 85 (1976)

76 MAS/RIC Masson, D. Richard, C., and Martin, R., "Thermal Isomerization of Cis- or Trans-2-Butene. The Unimolecular Elimination of Hydrogen from Cis-2-Butene Around 500°C," Int. J. Chem. Kinet. 8, 37 (1976)

76 MCC/KRU McCullough, R. W., Kruger, C. H., and Hanson, R. K., "Measurement of the Reaction Rate Constants of NO + O → N + $O_2$ and NO + H → N + OH at 1700 to 2100 K," West. St. Sect., Combustion Institute, 76 14, 29pp. (1976)

76 MEA/HEI Meagher, J. F., and Heicklen, J., "Reaction of HO with $C_2H_4$," J. Phys. Chem. 80, 1645 (1976)

76 MIC/PAY Michael, J. V., Payne, W. A., and Whytock, D. A., "Absolute Rate Constants for O + NO + M(=He, Ne, Ar, Kr) → $NO_2$ + M from 217-500 K," J. Chem. Phys. 65, 4830 (1976)

76 MIL Milks, D., "An Experimental Study of the Chemical Kinetics of the Reactions between Nitrous Oxide ($N_2O$), Nitrogen Dioxide ($NO_2$) and Carbon Monoxide (CO)," Diss. Abstr. Int. B 36, 4645 (1976)

76 OSI/HEI Osif, T. L., and Heicklen, J., "Oxidation of HCO Radicals," J. Phys. Chem. 80, 1526 (1976)

76 OVE/PAR Overend, R., Paraskevopoulos, G., and Black, C., "Rates of OH Radical Reactions. II. The Combination Reaction OH + NO + M," J. Chem. Phys. 64, 4149 (1976)

76 PAR/PAU Parkes, D. A., Paul, D. M., and Quinn, C. P., "Study of the Spectra and Recombination Kinetics of Alkyl Radicals by Molecular Modulation Spectrometry. Part 1. The Spectrometer and a Study of Methyl Recombination between 250 and 450 K and Perdeutero Methyl Recombination at Room Temperature," J. Chem. Soc., Faraday Trans. I 72, 1935 (1976)

76 PAR/QUI Parkes, D. A., and Quinn, C. P., "Study of the Spectra and Recombination Kinetics of Alkyl Radicals by Molecular Modulation Spectrometry. Part 2. The Recombination of Ethyl, Isopropyl and t-Butyl Radicals at Room Temperature and t-Butyl Radicals between 250 and 450 K," J. Chem. Soc., Faraday Trans. I 72, 1952 (1976)

76 PAT/ATK Pate, C. T., Atkinson, R. and Pitts, J. N. Jr., "The Gas Phase Reaction of $O_3$ with a Series of Aromatic Hydrocarbons," J. Environ. Sci. Health A 11, 1 (1976)

76 PAU/BAI Paur, R. J., and Bair, E. J., "The Isothermal Flash Photolysis of Hydrazoic Acid," Int. J. Chem. Kinet. 8, 139 (1976)

76 PAY/STI Payne, W. A., and Stief, L. J., "Absolute rate Constant for the Reaction of Atomic Hydrogen with Acetylene over an extended Pressure and Temperature Range," J. Chem. Phys.

64, 1150 (1976)

76 PER/ATK1 Perry, R. A., Atkinson, R., and Pitts, J. N. Jr., "Rate Constants for the Reactions OH + $H_2S$ → $H_2O$ + SH and OH + $NH_3$ → $H_2O$ + $NH_2$ over the Temperature Range 297-427°K," J. Chem. Phys. 64, 3237 (1976)

76 Per/ATK2 Perry, R. A., Atkinson, R., and Pitts, J. N. Jr., "Rate Constants for the Reaction of OH Radicals with n-Butane over the Temperature Range 297-420°K," J. Chem. Phys. 64, 5314 (1976)

76 PIL/ROB Pilling, M. J., Robertson, J. A., and Rogers, G. J., "The Flash Photolysis of Azomethane. Minor Products from the Photolysis of Methyl Radicals and a Rate Constant for $CH_3$ + NO," Int. J. Chem. Kinet. 8, 883 (1976)

76 PRA/ROG1 Pratt, G., and Rogers, D., "Homogeneous Isotope Exchange Reactions, $H_2/D_2$," J. Chem. Soc., Faraday Trans. I 72, 1589 (1976)

76 PRA/ROG2 Pratt, G., and Rogers, D., "Homogeneous Isotope Exchange Reaction. Part 2. $CH_4/D_2$," J. Chem. Soc., Faraday Trans. I 72, 2765 (1976)

76 PRA/VEL1 Pratt, G., and Veltman, I., "Kinetics of Reaction of Hydrogen Atoms with Ethylene," J. Chem. Soc., Faraday Trans. I 72, 1733 (1976)

76 PRA/VEL2 Pratt, G., and Veltman, I., "Kinetics of Addition of Methyl and Ethyl Radicals to Nitric Oxide," J. Chem. Soc., Faraday Trans. I 72, 2477 (1976)

76 ROT/EXN Roth, W. R., and Exner, H-D., "Rotationsbarriere der Geometrischen Isomerisierung von cis-und trans-1,4-Dimethylbutatrien," Chem. Berichte 109, 1158 (1976)

76 RYB/YAM Rybin, V. M., and Yampol'skii, Yu. P., "Effect of Hydrogen on Hexane Pyrolysis," Petro. Chem. USSR 16, 167 (1976); tr. of: Neftekhimiya 16, 729 (1976)

76 SCH/KNO Schliebs, R., Knoll, H., and Scherzer, K., "Ethyl Radical Initiated Thermal Decomposition of Biacetyl," React. Kinet. and Catal. Lett. 5, 141 (1976)

76 SHE/KAI Shevel'kova, L. V., Kalinenko, R. A., Vedeneeva, L. M., and Nametkin, N. S., "Determination of the Concentration of Hydrogen Atoms Upon Pyrolysis of Propane and the Rate Constant of their Interaction with Propane at High Temperatures," Dokl. Chem. 231, 781 (1976); tr. of: Dokl. Akad. Nauk SSSR 231, 1384 (1976)

76 SHI/OHI Shibuya, K., Ohi, K-I., and Tanaka, I., "The Reaction of Singlet Methylene with Methane," Bull. Chem. Soc. Jpn. 49, 2178 (1976)

76 SIE/SIM1 Sie, D. K. T., Simonaitis, R., and Heicklen, J., "The Reaction of OH with CO," Int. J. Chem. Kinet. 8, 85 (1976)

76 SIE/SIM2 Sie, D. K. T., Simonaitis, R., and Heicklen, J., "The Reaction

of OH with NO," Int. J. Chem. Kinet. 8, 99 (1976)

76 SIM/HEI Simonaitis, R., and Heicklen, J., "Reactions of $HO_2$ with NO and $NO_2$ and of OH with NO," J. Phys. Chem. 80, 1 (1976)

76 SIN/CVE Singleton, D. L., and Cvetanovic, R. J., "Temperature Dependence of the Reactions of Oxygen Atoms with Olefins," J. Am. Chem. Soc. 98, 6812 (1976)

76 SLA Slack, M. W., "Kinetics and Thermodynamics of the CN Molecule. III. Shock Tube Measurement of CN Dissociation Rates," J. Chem. Phys. 64, 228 (1976)

76 SLA/BLA1 Slanger, T. G., and Black, G., "$O(^1S)$ Production from Oxygen Atom Recombination," J. Chem. Phys. 64, 3767 (1976)

76 SLA/BLA2 Slanger, T. G., and Black, G., "Temperature Dependence for Quenching of $O(^1S)$ by $N_2O$," J. Chem. Phys. 65, 2025 (1976)

76 SLA/GRA Slagle, I. R., Graham, R. E., and Gutman, D., "Direct Identification of Reactive Routes and Measurement of Rate Constants in the Reactions of Oxygen Atoms with Methanethiol, Ethanethiol, and Methylsulfide," Int. J. Chem. Kinet. 8, 451 (1976)

76 STE/FRE Stephenson, J. C., and Freund, S. M., "Infrared Laser-enhanced Reactions: Chemistry of NO(v=1) with $O_3$," J. Chem. Phys. 65, 4303 (1976)

76 STI/PAY Stief, L. J., and Payne, W. A., "Absolute Rate Parameters for the Reaction of Atomic Hydrogen with Hydrazine," J. Chem. Phys. 64, 4892 (1976)

76 STR/HOW Streit, G. E., Howard, C. J., Schmeltekopf, A. L., Davidson, J. A., and Schiff, H. I., "Temperature Dependence of $O(^1D)$ Rate Constants for Reactions with $O_2$, $N_2$, $CO_2$, $O_3$, and $H_2O$," J. Chem. Phys. 65, 4761 (1976)

76 STR/JOH Streit, G. E., and Johnston, H. S., "Reactions and Quenching of Vibrationally excited Hydroxyl Radicals," J. Chem. Phys. 64, 55 (1976)

76 SUS/BRA Sustmann, R., und Brandes, D., "Syn/anti-Isomerisierung des 1-tert-Butylallylradikals," Chemische Berichte 109, 354 (1976)

76 TIC Ticktin, S., "The Kinetics and Mechanism of the Chemiluminescent Reaction of C Atoms with H Atoms," Diss. Abst. Int. B 37, 255 (1976)

76 TIT/BAL Titarchuk, T. A., Ballod, A. P., and Shtern, V. Ya., "Rate Constant of the Generation of Isopropyl Radicals during Thermal Nitration of Propane by Nitrogen Dioxide," Kinet. and Catal. 17, 932 (1976); tr. of: Kinet. i Katal. 17, 1070 (1976)

76 TOB/TOB Toby, F. S., Toby, S., and O'Neal, H. E., "The Kinetics of the Gas-Phase Reaction Between Ozone and Alkenes," Int. J. Chem. Kinet. 8, 25 (1976)

76 TSA1 Tsang, W., "Thermal Stability of Alcohols," Int. J. Chem. Kinet. 8, 173 (1976)

76 TSA2 Tsang, W., "Shock Tube Study on the Thermal Stability of some Acetylenic Compounds," Am. Chem. Soc. 172nd meeting (Abst. of Papers) 172, Phys 122 (1976)

76 TSU Tsuboi, T., "Mechanism for the Homogeneous Thermal Oxidation of Methane in the Gas-Phase," Jpn. J. Appl. Phys. 15, 159 (1976)

76 VAN Van den bergh, H. E., "The Recombination of Methyl Radicals in the Low Pressure Limit," Chem. Phys. Lett. 43, 201 (1976)

76 VID/WIL Vidyarthi, S. K., Willis, C., and Back, R. A., "Thermal and Photochemical Decomposition of Methyldiimide in the Gas Phase," J. Phys. Chem. 80, 559 (1976)

76 WAG/WEI Wagner, H. Gg., Welzbacher, U., and Zellner, R., "Rate Measurements for the Reactions H + $NO_2$ → OH + NO and H + NOCl → HCl + NO," Ber. Bunsenges. fuer Phys. Chem. 80, 1023 (1976)

76 WAM Wampler, F. B., "Photochemistry of the $SO_2$, 2-Pentene System at 3660 Å," Int. J. Chem. Kinet. 8, 935 (1976)

76 WAS/BAY Washida, N., and Bayes, K. D., "The Reactions of Methyl Radicals with Atomic and Molecular Oxygen," Int. J. Chem. Kinet. 8, 777 (1976)

76 WEI Weinberger, L. P., "Shock Tube Measurement of Nitric Oxide through the Chemiluminescent Reactions of CO-O and NO-O," Diss. Abst. Int. B 36, 3552 (1976)

76 WHY/MIC1 Whytock, D. A., Michael, J. V., and Payne, W. A., "Absolute Rate Constants for O + NO + $N_2$ → $NO_2$ + $N_2$ from 217-500 K," Chem. Phys. Lett. 42, 466 (1976)

76 WHY/MIC2 Whytock, D. A., Michael, J. V., Payne, W. A., and Stief, L. J., "Absolute Rate of the Reaction of Atomic Hydrogen with Acetaldehyde," J. Chem. Phys. 65, 4871 (1976)

76 WHY/PAY Whytock, D. A., Payne, W. A., and Stief, L. J., "Rate of the Reaction of Atomic Hydrogen with Propyne over an Extended Pressure and Temperature Range," J. Chem. Phys. 65, 191 (1976)

76 WHY/TIM Whytock, D. A., Timmons, R. B., Lee, J. H., Michael, J. V., Payne, W. A., and Stief, L. J., "Absolute Rate of the Reaction of $O(^3P)$ with Hydrogen Sulfide over the Temperature Range 263 to 495 K," J. Chem. Phys. 65, 2052 (1976)

76 WIL Williamson, D. G., "An Investigation of Gas Phase Ozonolysis Reactions," U.S. Environmental Protection Agency Report EPA-600/3-76-024, March 1976 (NTIS, PB 251671, 1976)

76 WIN/LLO Winer, A. M., Lloyd, A. C., Darnall, K. R., and Pitts, J. N. Jr., "Relative Rate Constants for the Reaction of the Hydroxyl Radical with Selected Ketones, Chloroethenes,

and Monoterpene Hydrocarbons," J. Phys. Chem. 80, 1635 (1976)

76 YAM — Yampol'skii, Yu. P., "The Concentrations of Radicals in Hexane Pyrolysis," React. Kinet. and Catal. Lett. 5, 111 (1976)

76 YAM/NAM — Yampol'skii, Yu. P., and Nametkin, N. S., "Rate Constants of Reactions of $CH_3$, $C_2H_5$, and Atomic Hydrogen with Butane at High Temperatures," Kinet. and Catal. 17, 46 (1976); tr. of: Kinet. i Katal. 17, 57 (1976)

76 YAM/TSI — Yampol'skii, Yu. P., Tsikhinski, V., "Concentrations of Radicals during the Pyrolysis of Isobutane in the 630-800° range," Neftekhimiya 16, 560 (1976)

76 ZEL/STE — Zellner, R., and Steinert, W., "A Flash Photolysis Study of the Rate of the Reaction $OH + CH_4 \rightarrow CH_3 + H_2O$ over an Extended Temperature Range," Int. J. Chem. Kinet. 8, 397 (1976)

1977

77 ARO/NAE — Aronowitz, D., and Naegeli, D., "High-Temperature Pyrolysis of Dimethyl Ether," Int. J. Chem. Kinet. 9, 471 (1977)

77 ATK/PER1 — Atkinson, R., Perry, R. A., and Pitts, J. N. Jr., "Absolute Rate Constants for the Reaction of $O(^3P)$ Atoms with n-Butane and NO(M=Ar) over the Temperature Range 298-439 K," Chem. Phys. Lett. 47, 197 (1977)

77 ATK/PER2 — Atkinson, R., Perry, R. A., and Pitts, J. N. Jr., "Rate Constants for the Reaction of OH Radicals with Ethylene over the Temperature Range 299-425°K," J. Chem. Phys. 66, 1197 (1977)

77 ATK/PER3 — Atkinson, R., Perry, R. A., and Pitts, J. N. Jr., "Absolute Rate Constants for the Reaction of OH Radicals with allene, 1,3-Butadiene, and 3-Methyl-1-Butene over the Temperature Range 299-424°K," J. Chem. Phys. 67, 3170 (1977)

77 ATK/PIT1 — Atkinson, R., and Pitts, J. N. Jr., "Absolute Rate Constants for the Reaction of $O(^3P)$ Atoms with a Series of Olefins over the Temperature Range 298-439°K," J. Chem. Phys. 67, 38 (1977)

77 ATK/PIT2 — Atkinson, R., and Pitts, J. N. Jr., "Absolute Rate Constants for the Reaction of $O^3(P)$ Atoms with Allene, 1,3-Butadiene, and Vinyl Methyl Ether over the Temperature Range 297-439 K," J. Chem. Phys. 67, 2492 (1977)

77 BAR/BEN — Barker, J. R., Benson, S. W., and Golden, D. M., "The Decomposition of Dimethyl Peroxide and the Rate Constant for $CH_3O + O_2 \rightarrow CH_2O + HO_2$," Int. J. Chem. Kinet. 9, 31 (1977)

77 BAT/MIL1 — Batt, L., and Milne, R. T., "The Gas-Phase Pyrolysis of Alkyl Nitrites. III. Isopropyl Nitrite," Int. J. Chem. Kinet. 9, 141 (1977)

77 BAT/MIL2 Batt, L., and Milne, R. T., "The Gas-Phase Pyrolysis of Alkyl Nitrites. IV. Ethyl Nitrite," Int. J. Chem. Kinet. 9, 549 (1977)

77 BAT/MIL3 Batt, L., Milne, R. T., and McCulloch, R. D., "The Gas-Phase Pyrolysis of Alkyl Nitrites. V. Methyl Nitrite," Int. J. Chem. Kinet. 9, 567 (1977)

77 BEM/CLY Bemand, P. P., and Clyne, M. A. A., "Atomic Resonance Fluorescence for Rate Constants of Rapid Bimolecular Reactions. Part 6. Hydrogen Atom Reactions: H + $Cl_2$ from 300 to 730 K and H + $NO_2$ at 298 K," J. Chem. Soc., Faraday Trans. II 73, 394 (1977)

77 BLA/SME Blauwens, J., Smets, B., and Peeters, J., "Mechanism of "Prompt" no Formation in Hydrocarbon Flames," Symp. Combust. 16 (Combustion Institute Pittsburgh, Pa., 1977) 1055

77 BON/TIM Bonanno, R. J., Timmons, R. B., Stief, L. J., and Klemm, R. B., "The Kinetics and Mechanisms of the Reactions of O($^3$P) Atoms with $CH_3CN$ and $CF_3CN$," J. Chem. Phys. 66, 92 (1977)

77 BOR/ZAM Borisov, A. A., Zamanskii, V. M., Potmishil, K., Skachkov, G. I., and Foteenkov, V. A., "The Mechanism of Methane Oxidation with Nitrous Oxide," Kinet. and Catal. 18, 256 (1977); tr. of: Kinet. i Katal. 18, 307 (1977)

77 BOW/DOD Bowman, C. T., and Dodge, L. G., "Kinetics of the Thermal Decomposition of Hydrogen Sulfide behind Shock Waves," Symp. Combust. 16, (Combustion Institute Pittsburgh, Pa., 1977) 971

77 BUR/HAR Burrows, J. P., Harris, G. W., and Thrush, B. A., "Rates of Reaction of $HO_2$ with HO and O Studied by Laser Magnetic Resonance," Nature (London) 267, 233 (1977)

77 CAM/HAN Campbell, I. M., and Handy, B. J., "Relative Rates of Reaction of Hydroxyl Radicals with O($^3$P) Atoms and CO molecules," Chem. Phys. Lett. 47, 475 (1977)

77 CAS/TAN Castleman, A. W. Jr., and Tang, I. N., "Kinetics of the Association Reaction of $SO_2$ with the Hydroxyl Radical," J. Photochem. 6, 349 (1977)

77 CHA/KAU Chang, J. S., and Kaufman, F., "Upper Limits of the Rate Constants for the Reactions of $CFCl_3$(F-11), $CF_2Cl_2$(F-12), and $N_2O$ with OH. Estimates of Corresponding Lower Limits to their Tropospheric Lifetimes," Geophys. Res. Lett. 4, 192 (1977)

77 CHA/USE Chan, W. H., Uselman, W. M., Calvert, J. G., and Shaw, J. H., "The Pressure Dependence of the Rate Constant for the Reaction: HO + CO → H + $CO_2$," Chem. Phys. Lett. 45, 240 (1977)

77 CHE/LEE Cheng, J-T., Lee, Y-S., and Yeh, C-T., "The Triplet Mercury Photosensitized Decomposition of Ethane at High Intensity," J. Phys. Chem. 81, 687 (1977)

77 CHE/YEH Cheng, J-T., and Yeh, C-T., "Pressure Dependence of the Rate Constant of the Reaction H + $CH_3$ → $CH_4$," J. Phys. Chem. 81, 1982 (1977)

77 CHU/LAN Chuchani, G., Martin, I., Yépez, M., and Diaz, M. J., "Kinetics of the Gas-Phase Pyrolysis of some Secondary Acetates,"

React. Kinet. Catal. Lett. 6, 449 (1977)

77 CLY/MØN Clyne, M. A. A., and Monkhouse, P. B., "Atomic Resonance Fluorescence for Rate Constants of Rapid Bimolecular Reactions. Part 5. Hydrogen Atom Reactions; H + $NØ_2$ and H + $Ø_3$," J. Chem. Soc. Faraday Trans. II 73, 298 (1977)

77 COL/NAE Colket, M. B. III., Naegeli, D. W., and Glassman, I., "High Temperature Øxidation of Acetaldehyde," Symp. Combust. 16, (Combustion Institute Pittsburgh, Pa., 1977) 1023

77 COX/ROF Cox, R. A., and Roffey, M. J., "Thermal Decomposition of Peroxyacetylnitrate in the Presence of Nitric Oxide," Env. Sci. and Tech. 11, 900 (1977)

77 CUE/CHU Cuenca, A., and Chuchani, G., "Steric Factors in the Gas-Phase Elimination of Esters: The Pyrolysis of 2,3-Dimethyl-3-Pentyl Acetate," Int. J. Chem. Kinet. 9, 379 (1977)

77 DAV/SCH Davidson, J. A., Schiff, H. I., Streit, G. E., McAfee, J. R., Schmeltekopf, A. L., and Howard, C. J., "Temperature Dependence of $O(^1D)$ Rate Constants for Reactions with $N_2O$, $H_2$, $CH_4$, HCl, and $NH_3$," J. Chem. Phys. 67, 5021 (1977)

77 DIA/SEL Diaz, E. R., Selby, K., and Waddington, D. J., "Reactions of Oxygenated Radicals in the Gas Phase. Part 3. Reactions of Peracetyl Radicals with Alkenes," J. Chem. Soc., Perkin Trans. II 3, 360 (1977)

77 ERL/FIE Erler, K., Field, D., Zellner, R., and Smith, I. W. M., "The Recombination Reaction between Hydroxyl Radicals and Nitrogen Dioxide. ØH + $NØ_2$ + M(=He,$CØ_2$) in the Temperature Range 213-300 K," Ber. Bunsenges. fuer Phys. Chem. 81, 22 (1977)

77 FAU/WAG1 Faubel, C., and Wagner, H. Gg., "Reaktionen von Kohlensuboxid, Teil I Die Reaktion von Wasserstoffatomen mit Kohlensuboxid," Ber. Bunsenges. fuer Phys. Chem. 81, 684 (1977)

77 FAU/WAG2 Faubel, C., Wagner, H. Gg., and Hack, W., "Reaktionen von Kohlensuboxid, Teil II Die Reaktion von Hydroxylradikalen mit Kohlensuboxid und mit Keten," Ber. Bunsenges. Phys. Chem. 81, 689 (1977)

77 FLØ/HAN Flower, W. L., Hanson, R. K., and Kruger, C. H., "Experimental Study of Nitric Øxide Decomposition by Reaction with Hydrogen," Combust. Flame and Tech. 15, 115 (1977)

77 FRE/PAL Freund, H., and Palmer, H. B., "Shock-Tube Studies of the Reactions of $NØ_2$ with $NØ_2$, $SØ_2$, and CO," Int. J. Chem. Kinet. 9, 887 (1977)

77 GLA/QUA Glaenzer, K., Quach, M., and Troe, J., "High Temperature UV Absorption and Recombination of Methyl Radicals in Shock Waves," Symp. Combust. 16 (Combustion Institute Pittsburgh Pa., 1977) 949

77 GER/EGO Gerhenzon, Yu. M., Egorov, V. I., and Rozenshtein, V. B., "Role of Vibrational Energy in the Reaction $N_2Ø(v3)$ + H → ØH + $N_2$," High Energy Chem. 11, 328 (1977); tr. of: Khim. Vys. Energi. 11, 291 (1977)

77 GRA/GUT Graham, R. E., and Gutman, D., "Temperature Dependence of

Rate Constants and Branching Ratios for the Reaction of Oxygen Atoms with Carbon Disulfide," J. Phys. Chem. 81, 207 (1977)

77 GRA/WIN Graham, R. A., Winer, A. M., and Pitts, J. N. Jr., "Temperature Dependence of the Unimolecular Decomposition of Pernitric Acid and its Atmospheric Implications," Chem. Phys. Lett. 51, 215 (1977)

77 HAM/LII Hamilton, E. J. Jr., and Lii, R-R., "The Dependence on $H_2O$ and on $NH_3$ of the Kinetics of the Self-Reaction of $HO_2$ in the Gas-Phase Formation of $HO_2.HO_2$ and $HO_2.NH_3$ Complexes," Int. J. Chem. Kinet. 9, 675 (1977)

77 HEF/PAR Heffington, W. M., Parks, G. E., Sulzmann, K. G. P., and Penner, S. S., "Studies of Methane-Oxidation Kinetics," Symp. Combust. 16 (Combustion Institute Pittsburgh, Pa., 1977) 997

77 HEN/KEN Hendry, D. G., and Kenley, R. A., "Generation of Peroxy Radicals from Peroxy Nitrates ($RO_2NO_2$). Decomposition of Peroxyacyl Nitrates," J. Am. Chem. Soc. 99, 3198 (1977)

77 HOC/GHO Hochanedel, C. J., Ghormley, J. A., Boyle, J. W., and Ogren, P. J., "Absorption Spectrum and Rates of Formation and Decay of the $CH_3O_2$ Radical," J. Phys. Chem. 81, 3 (1977)

77 HOL/KER Holt, P. M., and Kerr, J. A., "Kinetics of Gas-Phase Addition Reactions of Methyl Radicals. I. Addition to Ethylene, Acetylene, and Benzene," Int. J. Chem. Kinet. 9, 185 (1977)

77 HOW Howard, C. J., "Kinetics of the Reaction of $HO_2$ with $NO_2$," J. Chem. Phys. 67, 5258 (1977)

77 HOW/EVE Howard, C. J., and Evenson, K. M., "Kinetics of the Reaction of $HO_2$ with NO," Geophys. Res. Lett. 4, 437 (1977)

77 HUY/LUY Huybrechts, G., Luyckx, L., Vandenboom, Th., and Van Mele, B., "Thermal Dimerization of 1,3-Butadiene: Kinetics of the Formation of cis, cis-cyclooctа-1,5-diene," Int. J. Chem. Kinet. 9, 283 (1977)

77 IBU/TAK Ibuki, T., and Takezaki, Y., "Unimolecular Decomposition of Chemically Activated Methylallylether," Int. J. Chem. Kinet. 9, 201 (1977)

77 JUS/ROT Just, Th., Roth, P., and Damm, R., "Production of Hydrogen Atoms during the Thermal Dissociation of Ethylene Between 1700 and 2200°K," Symp. Combust. 16 (Combustion Institute Pittsburgh, PA., 1977) 961

77 KAI/WU Kaiser, E. W., and Wu, C. H., "Measurement of the Rate Constant of the Reaction of Nitrous Acid with Nitric Acid," J. Phys. Chem. 81, 187 (1977)

77 KHE/SOU Khe, P. V., Soulignac, J. C., and Lesclaux, R., "Pressure and Temperature Dependence of $NH_2$ Recombination Rate Constant," J. Phys. Chem. 81, 210 (1977)

77 KIN King, K. D., "Very Low-Pressure Pyrolysis (VLPP) of 3,3-Dimethylbut-1-yne (tert-Butyl Acetylene). The Heat of Formation and Stabilization Energy of the Dimethylpropargyl Radical," Int. J. Chem. Kinet. 9,

907 (1977)

77 KYL/ORC Kyle, E., and Orchard, S. W., "The Photolysis of Methyl Glyoxal Vapour at 436 nm," J. Photochem. 7, 305 (1977)

77 LAU/BAS Laufer, A. H., and Bass, A. M., "Reaction Between Triplet Methylene and $CO_2$: Rate Constant Determination," Chem. Phys. Lett. 16, 151 (1977)

77 LEDE/VIL Lédé, J., and Villermaux, J., "Mesure de Constantes Cinétiques D'espèces Très Réactives Dans Les Systèmes En Écoulement. II. Le réacteur autoagité par jets gazeux," J. de Chim. Phys., Phys.-Chim. Biol. 74, 468 (1977)

77 LEE/STI Lee, J. H., Stief, L. J., and Timmons, R. B., "Absolute Rate Parameters for the Reaction of Atomic Hydrogen with Carbonyl Sulfide and Ethylene Episulfide," J. Chem. Phys. 67, 1705 (1977)

77 LEE/TIM Lee, J. H., and Timmons, R. B., "Kinetics and Mechanism of the Gas-Phase Reaction of $O(^3P)$ Atoms with Acetone," Int. J. Chem. Kinet. 9, 133 (1977)

77 LEV/USE Levine, S. Z., Uselman, W. M., Chan, W. H., Calvert, J. G., and Shaw, J. H., "The Kinetics and Mechanism of the $HO_2$-$NO_2$ Reactions; The Significance of Peroxynitric Acid Formation in Photochemical Smog," Chem. Phys. Lett. 48, 528 (1977)

77 LIF/FRE Lifshitz, A., and Frenklach, M., "The Reaction between $H_2$ and $D_2$ in a Shock Tube: Study of the Atomic vs Molecular Mechanism by Atomic Resonance Absorption Spectrometry," J. Chem. Phys. 67, 2803 (1977)

77 MCK/TUR McKay, G., Turner, M. C., and Zare, F., "Comparison of the Mechanisms of the Thermal Decompositions of 2,2'-Azoisobutane and Azoisopropane," J. Chem. Soc., Faraday Trans. I 73, 803 (1977)

77 MIT/LER Mitchell, D. N., and LeRoy, D. J., "An Experimental Test of the Orbiting Resonance Theory of Hydrogen Atom Recombination at Room Temperature," J. Chem. Phys. 67, 1042 (1977)

77 MIY/MOR Miyauchi, T., Mori, Y., and Imamura, A., "A Study of Nitric Oxide Formation in Fuel-Rich Hydrocarbon Flames: Role of Cyanide Species, H, OH and O," Symp. Combust 16 (Combustion Institute Pittsburgh, Pa., 1977) 1073

77 MON/HAN1 Monat, J. P., Hanson, R. K., and Kruger, C. H., "Kinetics of Nitrous Oxide Decomposition," Combust. Sci. and Tech. 16, 21 (1977)

77 MON/HAN2 Monat, J. P., Hanson, R. K., and Kruger, C. H., "Determination of the Rate Coefficient for the Reaction $N_2 + O \rightarrow NO + N$," West. St. Sect., Combust. Inst., (Paper) 77-46, 31, (1977)

77 MOO/SIE Moortgat, G. K., Slemr, F., and Warneck, P., "Kinetics and Mechanism of the Reaction $H + CH_3ONO$," Int. J. Chem. Kinet. 9, 249 (1977)

77 MOY/BAR Moy, J., Bar-Ziv, E., and Gordon, R. J., "Temperature Dependence of the Laser Enhanced Reaction $NO + O_3(001) \rightarrow NO_2(^2B_{1,2}) + O_2$," J.

Chem. Phys. 66, 5439 (1977)

77 ØGU1 Ögura, H., "Pyrolysis of Acetylene behind Shock Waves," Bull. Chem. Soc. Jpn. 50, 1044 (1977)

77 ØGU2 Ögura, H., "Shock Tube Study on the Mechanism of Hydrogenation and Pyrolysis of Acetylene," Bull. Chem. Soc. Jpn. 50, 2051 (1977)

77 ØKA/SIN Öka, K., Singleton, D. L., and Cvetanovic, R. J., "Mercury Photosensitized Reaction of $H_2$ in the Presence of NO. Rate Constants of the H + NO + M → HNO + M and HgH + NO → HNO + Hg Reactions," J. Chem. Phys. 66, 713 (1977)

77 ØSI Ösie, T. L., "Reactions of the Singlet D Öxygen Atom and the Hydroxyl Radical with Methanol, Öxidation of the Formyl Radical and the Photochemical Öxidation of Formaldehyde," Diss. Abst. Int. B 37, 5659 (1977)

77 ØVE/PAR1 Överend, R., and Paraskevopoulos, G., "The Question of a Pressure Effect in the Reaction OH + CO at Room Temperature," Chem. Phys. Lett. 49, 109 (1977)

77 ØVE/PAR2 Överend, R., and Paraskevopoulos, G., "Rates of ØH Radical Reactions. III. The Reaction OH + $C_2H_4$ + M at 296°K," J. Chem. Phys. 67, 674 (1977)

77 PAR Parkes, D. A., "The Öxidation of Methyl Radicals at Room Temperature," Int. J. Chem. Kinet. 9, 451 (1977)

77 PER/ATK1 Perry, R. A., Atkinson, R., and Pitts, J. N. Jr., "Rate Constants for the Reaction of ØH Radicals with Dimethyl Ether and Vinyl Methyl Ether over the Temperature Range 299-427°K," J. Chem. Phys. 67, 611 (1977)

77 PER/ATK2 Perry, R. A., Atkinson, R., and Pitts, J. N. Jr., "Kinetics of the Reactions of OH Radicals with $C_2H_2$ and CO," J. Chem. Phys. 67, 5577 (1977)

77 PIL/RØB Pilling, M. J., and Robertson, J. A., "Flash Photolysis of Ketene Photolysis Mechanism and Rate Constants for Singlet and Triplet Methylene," J. Chem. Soc., Faraday Trans. I 73, 968 (1977)

77 RIC/TRU Rice, J. K., and Truby, F. K., "Methane Formation in Photolyzed $CH_3I$," Int. J. Chem. Kinet. 9, 693 (1977)

77 RØT/JUS Roth, P., and Just, Th., "Atomabsorptionsmessungen zur Kinetik der Reaktion $CH_4$ + Ø → $CH_3$ + ØH im Temperaturbereich 1500 ≤ T ≤ 2250 K," Ber. Bunsenges. Phys. Chem. 81, 572 (1977)

77 SCA/BAC Scacchi, G., and Back, M. H., "The Cycloaddition of Ethylene to Butene-2. II. Energy Relations," Int. J. Chem. Kinet. 9, 525 (1977)

77 SCH/KNO Schliebs, R., Knoll, H., and Scherzer, K., "The Thermal and Initiated Thermal Decomposition of Biacetyl-$d_6$," Int. J. Chem. Kinet. 9, 349 (1977)

77 SCH/WAG Schacke, H., Wagner, H. Gg., and Wolfrum, J., "Reaktionen von Molekuelen in definierten Schwingungszustanden (IV) Reaktionen schwingungsangeregter Cyan-Radikale mit Wasserstoff und einfachen Kohlenwasserstoffen," Ber. Bunsenges. Phys. Chem. 81, 670 (1977)

77 SCH/WØI Schmatjko, K. J., and Wolfrum, J., "Direct Determination of the Product Energy Distribution in the Reaction of O-Atoms with CN Radicals," Symp. Combust. 16 (Combustion Institute Pittsburgh, Pa., 1977) 819

77 SHI/EBA Shibuya, K., Ebata, T., Øbi, K., and Tanaka, I., "Rate Constant Measurements for the Reactions of HCØ with NØ and $Ø_2$ in the Gas Phase," J. Phys. Chem. 81, 2292 (1977)

77 SIM/HEI Simonaitis, R., and Heicklen, J., "The Temperature Dependence of the Reactions of $HØ_2$ with NØ and $NØ_2$," NASA Contract Report, NASA-CR-149898 (1977)

77 SIN/IRW Singleton, D. L., Irwin, R. S., and Cvetanovic, R. J., "Arrhenius Parameters for the Reactions of $O(^3P)$ Atoms with Several Aldehydes and the Trend in Alsehydic C-H Bond Dissociation Energies," Can. J. Chem. 55, 3321 (1977)

77 SLA Slack, M. W., "Rate Coefficient for $H + Ø_2 + M = HØ_2 + M$ Evaluated from Shock Tube Measurements of Induction Times," Combust. and Flame 28, 241 (1977)

77 SLE/WAR Slemr, F., and Warneck, P., "Kinetics of the Reaction of Atomic Hydrogen with Methyl Hydroperoxide," Int. J. Chem. Kinet. 9, 267 (1977)

77 SMI/MUT Smith, G. G., Mutter, L., and Todd, G. P., "Steric Effects in Homogeneous Gas-Phase Reactions. Pyrolysis of Isopropyl Esters," J. Org. Chem. 42, 44 (1977)

77 SPE/END Spencer, J. E., Endo, H., and Glass, G. P., "Reactions of Vibrationally Excited ØH," Symp. Combust. 16 (Combustion Institute Pittsburgh, Pa., 1977) 829

77 SPE/GLA Spencer, J. E., and Glass, G. P., "Some Reactions of OH(v=1)," Int. J. Chem. Kinet. 9, 111 (1977)

77 TRE/WRI Trenwith, A. B., and Wrigley, S. P., "Dissociation of 2-Methylbut-1-ene and the Resonance Energy of the 2-Methyl allyl Radical," J. Chem. Soc., Faraday Trans. I 73, 817 (1977)

77 VAN/VAN Vandooren, J., and Van Tiggelen, P. J., "Reaction Mechanisms of Combustion in Low Pressure Acetylene-Oxygen Flames," Symp. Combust. 16 (Combustion Institute Pittsburgh, Pa., 1977) 1133

77 WAN Wang, H-Y., "I. Activation Energies for the Gas Phase Reactions of Hydrogen Atom with Carbon Monoxide and with Ethylene & II. Rate Constants for the Reactions of Benzyl cation with Triethylphosphine and with Triethylarsine in 1,2-Dichloroethane," Diss. Abst. Int. B 37, 5688 (1977)

77 WES/DEH Westenberg, A. A., and DeHass, N., "A Flash Photolysis-

Resonance Fluorescence Study of the O + $C_2H_2$ and O + $C_2H_3Cl$ Reactions," J. Chem. Phys. 66, 4900 (1977)

77 WIL/BAC Willis, C., Back, R. A., and Purdon, J. G., "The Thermal Decomposition of Diimide in the Gas Phase: Kinetics and Stoichiometry," Int. J. Chem. Kinet. 9, 737 (1977)

77 WIN/LLO Winer, A. M., Lloyd, A. C., Darnall, K. R., Atkinson, R., and Pitts, J. N. Jr., "Rate Constants for the Reaction of OH Radicals with n-Propyl Acetate, sec-Butyl Acetate, Tetrahydrofuran and Peroxyacetyl Nitrate," Chem. Phys. Lett. 51, 221 (1977)

77 YAN Yano, T., "Shock-Tube Study of Thermal Decomposition of Propene in the Presence of Deuterium," Int. J. Chem. Kinet. 9, 725 (1977)

77 ZEL/ERI Zellner, R., Erler, K., and Field, D., "Kinetics of the Recombination Reaction OH + H + M → $H_2O$ + M at Low Temperatures," Symp. Combust. 16 (Combustion Institute Pittsburgh, Pa., 1977) 939

APPENDIX: CONVERSION TABLES

EQUIVALENT SECOND ORDER RATE CONSTANTS

| A \ B | $cm^3 mol^{-1} s^{-1}$ | $dm^3 mol^{-1} s^{-1}$ | $m^3 mol^{-1} s^{-1}$ | $cm^3 molecule^{-1} s^{-1}$ | $(mm\ Hg)^{-1} s^{-1}$ | $atm^{-1} s^{-1}$ | $ppm^{-1} min^{-1}$ | $m^2 kN^{-1} s^{-1}$ |
|---|---|---|---|---|---|---|---|---|
| 1 $cm^3 mol^{-1} s^{-1}$ = | 1 | $10^{-3}$ | $10^{-6}$ | $1.66 \times 10^{-24}$ | $1.604 \times 10^{-5} T^{-1}$ | $1.219 \times 10^{-2} T^{-1}$ | $2.453 \times 10^{-9}$ | $1.203 \times 10^{-4} T^{-1}$ |
| 1 $dm^3 mol^{-1} s^{-1}$ = | $10^3$ | 1 | $10^{-3}$ | $1.66 \times 10^{-21}$ | $1.604 \times 10^{-2} T^{-1}$ | $12.19\ T^{-1}$ | $2.453 \times 10^{-6}$ | $1.203 \times 10^{-1} T^{-1}$ |
| 1 $m^3 mol^{-1} s^{-1}$ = | $10^6$ | $10^3$ | 1 | $1.66 \times 10^{-18}$ | $16.04\ T^{-1}$ | $1.219 \times 10^4 T^{-1}$ | $2.453 \times 10^{-3}$ | $120.3\ T^{-1}$ |
| 1 $cm^3 molecule^{-1} s^{-1}$ = | $6.023 \times 10^{23}$ | $6.023 \times 10^{20}$ | $6.023 \times 10^{17}$ | 1 | $9.658 \times 10^{18} T^{-1}$ | $7.34 \times 10^{21} T^{-1}$ | $1.478 \times 10^{15}$ | $7.244 \times 10^{19} T^{-1}$ |
| 1 $(mm\ Hg)^{-1} s^{-1}$ = | $6.236 \times 10^4 T$ | $62.36\ T$ | $6.236 \times 10^{-2} T$ | $1.035 \times 10^{-19} T$ | 1 | 760 | $4.56 \times 10^{-2}$ | 7.500 |
| 1 $atm^{-1} s^{-1}$ = | $82.06\ T$ | $8.206 \times 10^{-2} T$ | $8.206 \times 10^{-5} T$ | $1.362 \times 10^{-22} T$ | $1.316 \times 10^{-3}$ | 1 | $6 \times 10^{-5}$ | $9.869 \times 10^{-3}$ |
| 1 $ppm^{-1} min^{-1}$ = at 298K, 1 atm. total pressure | $4.077 \times 10^8$ | $4.077 \times 10^5$ | 407.7 | $6.76 \times 10^{-16}$ | 21.93 | $1.667 \times 10^4$ | 1 | 164.5 |
| 1 $m^2 kN^{-1} s^{-1}$ = | $8314\ T$ | $8.314\ T$ | $8.314 \times 10^{-3} T$ | $1.38 \times 10^{-20} T$ | 0.1333 | 101.325 | $6.079 \times 10^{-3}$ | 1 |

To convert a rate constant from one set of units A to a new set B find the conversion factor for the row A under Column B and multiply the old value by it, e.g. to convert $cm^3 molecule^{-1} s^{-1}$ to $m^3 mol^{-1} s^{-1}$ multiply by $6.023 \times 10^{17}$.

Table adapted from Evaluated Kinetic Data for High Temperature Reactions, Volume 1: Homogeneous Gas Phase Reactions of the $H_2$-$O_2$ System, Butterworths, London, 1972.

EQUIVALENT THIRD ORDER RATE CONSTANTS

| A \ B | $cm^6 mol^{-2} s^{-1}$ | $dm^6 mol^{-2} s^{-1}$ | $m^6 mol^{-2} s^{-1}$ | $cm^6 molecule^{-2} s^{-1}$ | $(mm\ Hg)^{-2} s^{-1}$ | $atm^{-2} s^{-1}$ | $ppm^{-2} min^{-1}$ | $m^4 kN^{-2} s^{-1}$ |
|---|---|---|---|---|---|---|---|---|
| 1 $cm^6 mol^{-2} s^{-1}$ = | 1 | $10^{-6}$ | $10^{-12}$ | $2.76 \times 10^{-48}$ | $2.57 \times 10^{-10} T^{-2}$ | $1.48 \times 10^{-4} T^{-2}$ | $1.003 \times 10^{-19}$ | $1.447 \times 10^{-8} T^{-2}$ |
| 1 $dm^6 mol^{-2} s^{-1}$ = | $10^{6}$ | 1 | $10^{-6}$ | $2.76 \times 10^{-42}$ | $2.57 \times 10^{-4} T^{-2}$ | $148\ T^{-2}$ | $1.003 \times 10^{-13}$ | $1.447 \times 10^{-2} T^{-2}$ |
| 1 $m^6 mol^{-2} s^{-1}$ = | $10^{12}$ | $10^{6}$ | 1 | $2.76 \times 10^{-36}$ | $257\ T^{-2}$ | $1.48 \times 10^{8} T^{-2}$ | $1.003 \times 10^{-7}$ | $1.447 \times 10^{4} T^{-2}$ |
| 1 $cm^6 molecule^{-2} s^{-1}$ = | $3.628 \times 10^{47}$ | $3.628 \times 10^{41}$ | $3.628 \times 10^{35}$ | 1 | $9.328 \times 10^{37} T^{-2}$ | $5.388 \times 10^{43} T^{-2}$ | $3.64 \times 10^{28}$ | $5.248 \times 10^{39} T^{-2}$ |
| 1 $(mm\ Hg)^{-2} s^{-1}$ = | $3.89 \times 10^{9} T^{2}$ | $3.89 \times 10^{3} T^{2}$ | $3.89 \times 10^{-3} T^{2}$ | $1.07 \times 10^{-38} T^{2}$ | 1 | $5.776 \times 10^{5}$ | $3.46 \times 10^{-5}$ | 56.25 |
| 1 $atm^{-2} s^{-1}$ = | $6.733 \times 10^{3} T^{2}$ | $6.733 \times 10^{-3} T^{2}$ | $6.733 \times 10^{-9} T^{2}$ | $1.86 \times 10^{-44} T^{2}$ | $1.73 \times 10^{-6}$ | 1 | $6 \times 10^{-11}$ | $9.74 \times 10^{-5}$ |
| 1 $ppm^{-2} min^{-1}$ = at 298K, 1 atm. total pressure | $9.97 \times 10^{18}$ | $9.97 \times 10^{12}$ | $9.97 \times 10^{6}$ | $2.75 \times 10^{-29}$ | $2.89 \times 10^{4}$ | $1.667 \times 10^{10}$ | 1 | $1.623 \times 10^{6}$ |
| 1 $m^4 kN^{-2} s^{-1}$ = | $6.91 \times 10^{7} T^{2}$ | $69.1\ T^{2}$ | $6.91 \times 10^{-5} T^{2}$ | $1.904 \times 10^{-40} T^{2}$ | 0.0178 | $1.027 \times 10^{4}$ | $6.16 \times 10^{-7}$ | 1 |

See note to Table for Second Order Rate Constants

NBS-114A (REV. 2-80)

| U.S. DEPT. OF COMM. **BIBLIOGRAPHIC DATA SHEET** *(See instructions)* | 1. PUBLICATION OR REPORT NO. NBSIR 81-2254 | 2. Performing Organ. Report No. | 3. Publication Date |
|---|---|---|---|

**4. TITLE AND SUBTITLE**
Table of Experimental Rate Constants for Chemical Reactions Occurring in Combustion (1971-1977)

**5. AUTHOR(S)**
Francis Westley

**6. PERFORMING ORGANIZATION** *(If joint or other than NBS, see instructions)*

**NATIONAL BUREAU OF STANDARDS**
**DEPARTMENT OF COMMERCE**
**WASHINGTON, D.C. 20234**

**7. Contract/Grant No.**

**8. Type of Report & Period Covered**

**9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS** *(Street, City, State, ZIP)*
Department of Energy, Washington, DC and
Office of Standard Reference Data, National Bureau of Standards, Washington, DC

**10. SUPPLEMENTARY NOTES**

☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

**11. ABSTRACT** *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)*

A table of experimental rate constants for gas phase chemical reactions occurring in combustion is presented. Specifically, it gives in tabular form the values of the parameters for the modified Arrhenius equation $k = AT^{B}\exp(-E/RT)$. The table covers reactions occurring in the combustion, oxidation and decomposition of aliphatic saturated or unsaturated $C_1$ to $C_{10}$ hydrocarbons, alcohols, aldehydes, ketones, thiols, ethers, peroxides, amines, amides and their free radicals, as well as the reactions of O, $O_2$, H, $H_2$, OH, $H_2O$, $H_2O_2$, N, $N_2$, NO, $N_2O$, $NO_2$, $N_2O_4$, $N_2O_5$, S, $S_2$, SH, SO, $SO_2$, SOH, NS, with each other. The table includes 220 monomolecular, 1092 bimolecular, and 108 termolecular reactions totalling 1420 distinct chemical reactions. There are 2608 distinct entries, distributed as follows: 308 for first order reactions, 1984 for second order reactions and 316 for third order reactions. The kinetic data were compiled from 843 experimental papers published between 1971 and 1977.

**12. KEY WORDS** *(Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)*
Arrhenius parameters, chemical kinetics, combustion, decomposition, free radicals, gas phase, hydrocarbons, hydrogen, nitrogen, oxygen, rate of reaction, sulfur

**13. AVAILABILITY**

☒ Unlimited
☐ For Official Distribution. Do Not Release to NTIS
☐ Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
☒ Order From National Technical Information Service (NTIS), Springfield, VA. 22161

**14. NO. OF PRINTED PAGES**
206

**15. Price**
$17.00

USCOMM-DC 6043-P80